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DISEASES OF THE STOMACH

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BECAUSE of the existing inaccuracies and misconceptions regarding most of the diseases of the stomach, the president has invited this discussion in the hope that it will make more rational much of the present day treatment which is so often haphazard and unsatisfactory. A review of the existing state of our knowledge of the pathology of the digestive system should enable us to deduce therefrom the course which should be pursued in the treatment of cases presenting the evidences of disease of these organs, more especially of the stomach, with which this discussion is more concerned. In view of the marked advance in recent years of our knowledge of diseases of the stomach, statistics, such as those of Brinton, to which so much importance has been attached in the past, have ceased to be of much practical value.

There is perhaps no organ whose function has been more misunderstood; even yet misconceptions are widely prevalent. The ancients showed by the very name abdomen (*abdere*, to conceal) that they recognized the great difficulties in interpreting the significance of disturbances caused by disease within its cavity. Depending, as they had to do, on clinical phenomena alone, it was, in truth, a hidden cavity, and to appreciate that fact shows him a philosopher who gave it the name "abdomen." All will concur in the appropriateness of the name, for who has not met with case after case in which there were no symptoms of disease, or in which the symptoms bore little, if any, apparent relationship to the disease that was later found to exist.

With the advent of pathological anatomy much progress was

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XUM

made in the understanding of abdominal as well as of other diseases, but histological study, even by the eminent masters, had its limitations. It revealed the conditions at death, and these may, and often do, differ greatly from those present during the course of the disease, especially in its early period. The explanation of the symptoms, even when they are quite significant and the morbid changes are quite easily determined, were yet to be found, and much of this ground still remains to be explored.

The functional relations of the abdominal organs are very complex, a fact that largely accounts for the simulation of disease of one organ for that of another. Great advance has been made in the unravelling of this complex relationship during the last quarter of a century by an army of physiological workers, led by Pawlow, Starling and others. In the last decade the great advance in abdominal surgery has given the opportunity of studying the pathological conditions in the living subject and their relation to the train of symptoms to which they gave rise, and which are arrested by the cure or removal of the diseased part. These two sources of knowledge have enabled us to interpret many symptoms which had before been inexplicable.

Of all the abdominal organs the stomach has by far the widest and most complex relationships, in fact the widest and most complex of any organ in the body. It is closely connected not only with the other abdominal organs, but also with those above the diaphragm, especially the brain and heart. It is therefore peculiarly susceptible to referred disturbances from all parts, near and remote, functional and organic, psychical as well as physical. This accounts for the difficulty in differentiating between disease and referred disturbance of the stomach.

The marked susceptibility of the stomach is due to its rich nerve supply from both autonomic and cerebro-spinal systems; the other abdominal organs, although richly supplied by the autonomic system, have but a scant supply from the cerebro-spinal. The stomach is directly connected with the basal ganglia of the brain through the pneumogastric nerves, so that psychical impressions have nearly, or quite, as much influence on its functions as they have on those of the heart, although we may not be as acutely conscious of it. The spinal nerves from the sixth to the ninth dorsal connect it closely with the spinal cord by many fibres, furnished through the sympathetic. It is chiefly through these fibres that we become conscious of disturbances of the stomach, whether from local organic disease or referred causes. Sensory impressions in the stomach,

whether painful or otherwise, are usually referred to the area of distribution of these same nerves in the precordial surface or in the epigastrium. The coldness in the epigastrium felt after drinking cold water is prevented or arrested by applying warmth to this region; even the warm hand will be sufficient. On the contrary, an enema of cold water causes no sensation of cold beyond the anus with which the cold tube is in contact. That much of the pain of local gastric disease, as ulcer, etc., is referred to the surface is evident from the superficial tenderness so frequently present in the epigastrium, as well as from the relief so often afforded by the local application of heat and counter irritants.

The stomach as a receptacle develops in the scale of animal creation after the cerebro-spinal nervous system appears, that is after the supply of food has to be intermittent. As the scale rises the stomach becomes more and more definitely differentiated in structure, and more under the influence of the cerebro-spinal system, reaching the acme in man in whom it becomes much more subject to psychical influences.

The pylorus, and all below it, even in man, remains almost wholly under the control of the autonomic system. The sphincter function of the pylorus is physiologically under the control of the duodenum, but pathologically it may be closed for a varying time by serious damage of any part of the intestinal tract, and, possibly, of other abdominal organs, as the gall-bladder and pancreas. In experimental gunshot wound through the intestine, the pylorus closes automatically, and may remain so for some hours (Mayo, *Boston Med. & Surg. Jnl.*, April 8, 1911); at the same time peristalsis of the intestine is arrested, thus preserving the peritoneal cavity from the escape of gastric and intestinal contents. It is closed also in severe pain in any part of the intestinal tract. To this, as well as to the referred irritation of the stomach, is due the vomiting which nearly always follows if the injury is severe, as in rupture or perforation of the appendix, and in strangulation of the bowel. Recurrent pain, or even disturbance or discomfort in any part of the abdomen, usually leads to some degree of spasmodic contraction of the pylorus, and may be a fruitful cause of the delay of food in the stomach, which is so frequent in disturbed digestion from various diseases in the intestinal tract.

The relationships of the stomach being so wide and varied, its reflex or "referred" disturbances are well-nigh innumerable. It is not only in intra-abdominal diseases of all kinds that gastric symptoms may be the chief or even the only complaint, but also

XUM

in chronic diseases in general, both functional and organic. We are all familiar with the grave gastric disturbance which may herald and be associated with intracranial disease, such as tumour, abscess, meningitis, and uræmia and opium poisoning. In cases of tabes we meet from time to time those in which gastric crises are the only symptoms, and in some of which gastroenterostomy has been done. In failing circulation from any cause, gastric distress may be the only complaint for which relief is sought. Loss of appetite and distress after food are often the predominant symptoms of the toxæmia associated with arterio-sclerosis and renal inadequacy. In the anæmias, whether primary or secondary, disturbed digestion is usually the earliest complaint, and to it in many cases is attributed the failing health. This is equally true of tuberculosis, of which failing digestion may be the earliest symptom. Of the innumerable symptoms of neurasthenia none are so frequent as derangement of digestion in a variety of forms, such as pain, acidity, flatulence, loss of appetite, etc.

The prominence of gastric symptoms in all these conditions is largely due to the associated psychical depression, than which no cause has more influence on the digestive processes. This is well illustrated by the case of a young woman who suffered much epigastric pain from all kinds of food, even barley water, due, it was supposed, to gastric ulcer. She was booked to sail for Europe two weeks later, an engagement she could not keep unless relieved. A careful investigation showed that her symptoms were doubtless due to nervous and psychical causes. As her condition and the circumstances were such as to render her very susceptible to mental suggestion, she was assured that she would be able to go if, in the meantime, she followed directions fully—to remain in bed under efficient nurse care, to ignore her symptoms, to take three full meals daily, and to have no concern about constipation, but go to the closet daily at regular hours; that is, to have no concern, but live as nearly as possible a vegetative life. She carried out the intructions fully, with the result that she had no discomfort although she took full meals, the bowels moved regularly and fully, and she slept well; she gained seven pounds the first week and five pounds the second. She enjoyed her three months tour, and returned in good health.

From time to time we meet with cases in which long continued irritation from food in excess or of unsuitable character so affects the nerve supply of the stomach itself as to produce a symptom complex, similar to, and even indistinguishable from, that of or-

ganic disease. They are frequently difficult to relieve and occasionally require gastro-enterostomy. Such cases are often markedly neurasthenic, and may show local tenderness over areas corresponding to the appendix, the gall-bladder, the duodenum, and various other parts. These are some, among the many, with a history of pain and tenderness in the right iliac fossa, such that the existence of chronic appendicitis is regarded as certain, so certain that an operation is undertaken not rarely with the confident assurance of a complete cure, with the result that a healthy appendix is found, removed, and the symptoms perhaps relieved for a few weeks, but soon to return as troublesome as before. As to the frequency with which such operations are done, the surgeons can best inform us, but as to the subsequent history the physicians are only too painfully aware.

It is important not to overlook the fact that it is not alone in these general and local conditions that "referred" or secondary gastric symptoms occur. Even in the various organic diseases of the stomach itself referred symptoms blend with and may overshadow those due to the organic disease. For example, in gastric ulcer the pain is at least in part, probably a large part, due to hyperirritability of the nervous system, perhaps chiefly of the section of the spinal cord which supplies the stomach, and to the associated psychial depression or irritation. This is evident from the variability of pain and other symptoms.

There are two chief functions of the stomach, the mechanical and the chemical. Of these the mechanical is of much the greatest inportance. Any interference with it, whether from obstruction of the pylorus, spasmodic, or organic, or from loss of peristaltic power of the stomach, leads to retention of the contents and is soon followed by derangements of digestion.

The chemical function, on the other hand, is a very variable one, being easily affected by extraneous influences, especially of a psychical nature; the gastric secretion may be absent at one period of the day and abundant at another. It is not vital, as it may be much altered or even wanting for long periods without grave results, provided the mechanical function is duly carried out. It is unfortunate, and rather remarkable, that in the numerous works on diseases of the stomach, the greatest emphasis has been laid on the chemistry of the gastric secretion, and minute directions given for making innumerable tests, while the mechanical side of the work of the stomach has been relegated to a secondary place. It illustrates how a theory once set on foot is taken up by suc-

XUM

cessive writers each elaborating it further, until the whole profession has become obsessed with it. The degree of hydrochloric acid acidity has been arbitarily fixed without regard to the wide normal variations, and little regard given to the due discharge of the food before each successive meal, without which efficient digestion is not possible. Views are becoming more sane of late, with the growth of fuller knowledge.

By way of conclusion it may be well to emphasize the fact that as the nervous relationship of the stomach to all parts of the body is wider than that of any other organ, its reflex or "referred" disturbances are proportionately the most frequent and varied. These referred disturbances are caused not only by local diseases but by general conditions, psychical as well as physical. Further, psychical disturbances are present in most cases of organic disease, and more or less influence the symptoms due to organic disease, not rarely overshadowing them. The great majority of gastric disturbances are secondary to general conditions, or local disease elsewhere than in the abdomen, as nervous diseases, organic and functional; abnormal blood states, as from anæmia, renal and cardiac inadequacy, and unsanitary conditions of living. After these, and making up much the greater number of the remaining minority, come local diseases within the abdomen, such as those of the appendix, the gall-bladder, the duodenum, and less often the pancreas. Disease and inadequacy of the cæcum and large bowel, leading to stasis and constipation should be added. If all the foregoing are eliminated there will be left but a very small percentage of cases to be accounted for by organic disease of the stomach itself.

The whole digestive tube from mouth to anus is but the inner surface of the body. The stomach is the most highly specialized part of the tract. If its organic diseases therefore are not relieved by careful treatment, appropriate surgical means should then be considered, as is done with disease of the external body surface. The existence of peptic ulcer has been long known, but it is only within little more than a decade that surgical knowledge and surgical confidence have felt themselves equal to deal with it. However, we have travelled far since then.

As between organic and referred disturbance of the stomach a differentiation in many cases can be made only by a painstaking repeated examination and a critical study of the patient's history. Even with such an investigation made with an unbiased mind, in not a few cases it will not be possible to exclude with certainty the existence of organic disease, or to determine with certainty the nature of the organic disease, if present.

RETENTION OF THE GASTRIC CONTENTS

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IN discussing the subject of the retention of the stomach contents, normal gastric motility must be thoroughly understood. Gastric tonus is a state of more or less shortening of the circular muscle of the stomach.* Peristaltic waves are independent of intragastric pressure. The peristalsis of the stomach consists of a series of continuous waves following each other in rhythmic succession. Tone is necessary for normal gastric peristalsis. The function of the stomach is that of a reservoir, the contents of which it must deliver to the intestine in a definite time. In the interval the food undergoes certain changes which we term digestion. The food and secretions are churned up together and prepared before being emptied into the duodenum. The stomach does not empty itself by gravity drainage. The cardiac and pyloric portions of the stomach are divided by the angular notch, *incisura angularis*. It is the pyloric portion that has to do with propelling the food onward by deep peristaltic waves; the cardiac portion contracts and thus presses the food on toward the pylorus. The stong peristalsis in the pyloric half of the stomach churns the food to the consistency of cream. As long as food remains in the stomach this peristaltic action continues, but it stops at the pyloric orifice; it does not pass on into the duodenum.

Hydrochloric acid in the stomach relaxes the pylorus. A delay in the acid reaction in the pyloric region causes retention of food in the stomach in spite of strong peristalsis. When the acid chyme is discharged into the duodenum, the pylorus closes, for acid in the duodenum has an effect upon the pylorus directly opposite to that of acid in the stomach. The closure of the pylorus continues until all the acid in the duodenum has been neutralized, when the acid in the stomach again relaxes the pylorus and the chyme is injected into the

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*W. B. Cannon, "The Mechanical Factors of Digestion," 1911.

XUM

duodenum. This alternation of movement, the opening and closing of the pylorus, continues until the stomach is completely emptied.

Retention of the stomach contents is not a disease in itself, but a symptom complex. Different names have been given it, such as dilatation of the stomach, ectasia ventriculi, gastrectasis, ischochymia, and motor insufficiency of the second degree. The cause of the condition is usually an obstruction of the pylorus; and since the pyloric stenosis eventually produces a complete pathologic picture, it has become customary to speak of gastric retention as a separate affection.

In retention due to stenosis the first effect upon the musculature of the stomach is hypertrophy; but as the pyloric obstruction becomes less and less permeable, muscular weakness and gastric dilatation result.

If the pylorus is functionally inefficient owing to a constricted lumen, motor disturbance must follow. The fundus may be compared to the auricle and the pylorus to the ventricle of the heart. In mitral regurgitation there is at first a compensating hypertrophy of the left ventricle; but as soon as this compensation is broken, dilatation occurs. This same process of hypertrophy and dilatation of the stomach musculature occurs in stenosis of the pylorus.

At one time the opinion prevailed among the clinicians that abnormality in the size or position of the stomach was largely responsible for motor disturbances. It has been found, however, that greatly dilated and ptotic stomachs do not of necessity interfere with gastric motility. They are not pathologic *per se*.

The absolute size of a stomach is of no significance; a large and apparently dilated stomach may be functionally efficient. Ewald has given the name "megalogastria" to the normally large stomach. The material point in the diagnosis of gastric retention is not size, but stagnation of contents. A stomach in which the food contents are stagnant because they cannot be evacuated is dilated in the clinical sense.

A stomach in health should empty itself of a large meal in seven hours. The term "motor insufficiency of the first or second degree" has been given to disturbances in the motility of the stomach. In motor insufficiency of the first degree the evacuation of the stomach, though complete, is retarded. In motor insufficiency of the second degree the stomach has entirely lost the ability to expel its contents; that is, food residues remain in the stomach permanently, inducing stagnation; and as a consequence of this chronic condition of gastric insufficiency, dilatation of the stomach ensues.

Motor insufficiency of the first degree is contingent upon a primary relaxation of the muscular wall of the stomach, or a loss of gastric tonus. This condition, which is often found, is known clinically as gastric atony or myasthenia. In gastric atony the muscles may be so greatly distended by large quantities of food as to constitute a condition of transient dilatation of the stomach, but this condition must be differentiated from established or permanent dilatation. Should a person with a normal musculature drink a sufficient quantity of water, the lower border of the stomach would descend to the level of the umbilicus, as shown by gastric dullness or the *x*-ray; but an atonic stomach may be so distended by fluids that the lower border falls below this point. Splashing sounds elicited when the stomach should be empty help to confirm the diagnosis of atony. The stomach in a condition of atony contains food remnants seven hours after the ingestion of a full meal; it, however, empties itself completely during the night after a full meal. This is the all-important point in arriving at a positive clinical diagnosis of atony.

In motor insufficiency of the second degree there is an obstruction to the pyloric outlet. The musculature is hypertonic rather than atonic. The gastric walls are hypertrophied from the peristaltic movements of the stomach in its persistent efforts to empty itself. Careful clinical and anatomic examinations have shown us that stenosis of the pylorus is the cause of motor insufficiency of the second degree. The lumen of the pylorus may be narrowed from the inside or from the outside; it may be cicatrized and contracted from the healing of gastric ulcers, or there may be cicatricial tissue as a result of healed perforations from biliary calculi. Spastic stenosis of the pylorus is by no means a rare condition; it is caused by the irritating effect of the ingesta upon erosion or fissure of the pylorus or by an abnormally high degree of gastric acidity. This closure of the pylorus is at first periodic (pylorospasm), but when the attacks become more frequent there results a permanent stenosis. Hypertrophy of the pylorus may result from chronic gastritis, angulation from gastroptosis, perigastric adhesions, epigastric hernia, or repeated injuries in this portion of the stomach. In hypertrophic changes in the pylorus, the process is slowly progressive. These cases pass from mechanical motor insufficiency (atony), to motor insufficiency of the second degree (dilatation).

Syphilis may become an etiologic factor in chronic hypertrophy of the pylorus. Internal stenosis resulting from malignant

XUM

tumors is by no means rare. Polypi and myomata are occasionally met with. Adhesions of the stomach to neighbouring organs or to abdominal tumors may cause pyloric stenosis by compression or by bending the pylorus upon itself. Among the more remote causes a right movable kidney may be mentioned.

Though pyloric stenosis may be the starting point of gastric dilatation, this result does not follow so long as the stomach musculature is capable of overcoming the obstruction. Stenosis which develops slowly leads to hypertrophy of the musculature precisely as in valvular insufficiency. This compensation may render efficient service for a long time—under certain circumstances for life. But indiscretion in diet may throw too much work upon the hypertrophic musculature, or the stenosis may increase by cicatrization; in either case, retention of the gastric contents is apt to follow, with consequent dilatation of the stomach. We may say that dilatation of the stomach is a pyloric affection in the stage of disturbed muscular compensation.

It was not until Kussmaul introduced the use of the stomach tube that a complete revolution in the diagnosis and treatment of retention of the stomach contents was rendered possible. A precise diagnosis cannot be made without the aid of the stomach tube; but with this aid and intelligent, systematic examination of the stomach contents, the physician may make an early and accurate diagnosis and save the patient much suffering.

Next to ulcer, carcinoma of the pylorus is the most important and dangerous cause of occlusion of the pyloric lumen. The differentiation is often a very difficult one. A tumor may be so small and smooth as to entirely escape palpation, and there may be nothing but the motor disturbance to indicate stenosis.

A grave complication of ulcer is perigastritis. Adhesions may change the lumen of the pylorus by displacement and distortion. Cholecystitis may lead to the same result, as it may impede the motility of the pylorus by adhesions, forming the cobwebs of Morris. I recall a case of gastric retention where all the clinical symptoms pointed to a carcinomatous affection. Stagnation was present with lactic acid, pus and blood in the gastric contents At operation the stomach was dilated, but there was no tumor. Instead, there was found an infected gall-bladder, with gall-stones and adhesions. The gall-stones were removed, the bladder drained, and the patient made a complete recovery.

An exact anamnesis assists greatly in making out the actual cause of the affection. The various data of the entire course

of the affection should be carefully recorded before a physical examination is made. An affection that dates back several years is probably not malignant, but it should always be remembered that an old ulcer may have become carcinomatous.

By far the most important symptom of gastric retention is vomiting, which is usually profuse. At first it does not occur often, but the intervals continue to grow shorter until at last large quantities, apparently larger than those ingested, are vomited every day. The vomitus will contain food remnants many days old, for food that is not readily digestible may remain in the stomach for weeks.

On standing in a sedimentation glass, the vomitus usually separates into three layers. The solid particles, being the heaviest, sink to the bottom; the fluid above is cloudy, and the top layer consists of more or less viscid mucus permeated by gas bubbles. This stratification in three layers is thoroughly characteristic of all forms of gastric retention which are due to or associated with stenosis of the pylorus.

The vomiting of malignant stenosis is totally different, especially after the affection has reached an advanced stage. The vomitus is no longer dilute, but viscid—like a thick soup—and permeated by mucous masses, everything being so closely intermixed that it is difficult to diffuse the mass with water. The odour is peculiarly mouldy, sometimes absolutely putrid, like decomposed tissue. The food remnants are almost unchanged. Meat can be found days after being taken into the stomach, and even farinaceous food is undigested. The appearance of the gastric contents is so characteristic as to be almost sufficient of itself to determine the diagnosis. On the other hand, there may be demonstrable carcinoma when the gastric contents do not present this characteristic appearance.

Admixture of blood in the gastric contents is less frequent in benign stenosis. According to quantity and the time the blood has been stagnant in the stomach, its colour varies from light yellow to dark brown. At times the admixture of blood can only be detected microscopically or chemically. Persistent occult hæmorrhages occur in malignant stenosis and they can be demonstrated both in the stomach contents and in the fæces. Profuse hæmatemesis occurs much more frequently in benign stenosis with ulcer than in the malignant form.

The patients often suffer severe pains, which will not subside until the stomach has been emptied by vomiting or lavage. Or the sensation may be simply one of pressure, fullness, and discomfort.

XUM

The severe pains are probably the consequence of exaggerated distention from the gases of fermentation. As soon as the patients learn that evacuation of the stomach gives relief they purposely induce vomiting by putting a finger into the throat.

A very uncomfortable manifestation is the constant thirst. Since the water taken into the stomach is neither absorbed nor passed into the duodenum, the body becomes impoverished for fluid. That as much water as possible may be retained within the body (another instance of physiologic compensation), less than the normal proportion is eliminated by the kidneys. Patients are often unable to speak on account of the dryness of the tongue. There is usually constipation, which increases with the increase of stagnation. Insufficient absorption of water and the daily loss of water are responsible for this condition.

Nutrition suffers in all cases, whether the cause of the pyloric affection be malignant or not. Losses in weight of forty to fifty pounds are by no means rare. There are also characteristic peculiarities in the appearance of patients. If the nutritive disturbances are very considerable and there occurs an exacerbation of stagnation and fermentation in debilitated patients, the inanition may result in grave delirium, which will subside if it is possible to improve the digestion.

The examination of patients should include the entire body. Inspection of the abdomen may furnish valuable information. Peristaltic waves from left to right and gradually disappearing at the pylorus may occasionally be seen. This manifestation is most important and decisive of pyloric stenosis. The whole stomach may contract and its outline easily be seen through the abdominal wall. But this phenomenon is not always pronounced and may be absent; cold seems to elicit it most readily. By palpating the wall of the abdomen during this manifestation of "stomach stiffening," the greater curvature can be distinctly perceived.

The succussion sound has been erroneously looked upon as a pathognomonic sign of dilatation of the stomach. In nearly every individual who has ingested large quantities of fluids and whose abdominal walls are somewhat atonic, the succussion sound can be elicited; consequently, a symptom of this kind can only be utilized for diagnostic purposes with a certain measure of precaution. The succussion sound is suspicious if it occurs with an empty stomach in the morning or several hours after a meal, providing no large quantities of liquids have been ingested; but a diagnosis which depends exclusively upon this phenomenon is altogether unreliable.

A question of importance is whether the succussion sound occurs above the umbilicus or below. It is difficult to tell whether the sound proceeds from the stomach or from the intestine, and for this reason great caution is necessary. The succussion sound, present at a time when the stomach should be empty, presupposes a large atonic stomach and is suggestive of dilatation.

The size of the stomach can be easily determined by auscultatory percussion. Inflation of air or carbon dioxide for that purpose is frequently done. The *x*-ray after ingestion of bismuth is most reliable. When there is stenosis the shadow shows a distorted duodenal cap. After the size of the stomach has been determined, its capacity of distention can be learned by percussing the lower border during lavage after one pint of water has been introduced. The level to which the dullness sinks can in this way be clearly made out.

But nothing short of the stomach tube can furnish a correct diagnosis. The normal stomach should be empty six to seven hours after a test meal, and if the stomach is washed out at this time stagnation, if present, is easily discovered. Again, the patient is given with his evening meal rice, raisins, and prunes, and the contents of the stomach are removed the next morning before breakfast. If the stomach is found to be empty, there is no retention, no matter what size the organ has attained. The persistent presence of food remnants in a fasting stomach is decisive of retention.

Demonstration of lactic acid and the determination of the reaction for hydrochloric acid are of decided importance in determining whether a stenosis is benign or malignant. In nearly all cases of retention which have developed from a pyloric ulcer or its scar, there is hyperchlorhydria. In primary carcinoma there is almost always achlorhydria. Carcinoma must never be excluded, however, because hydrochloric acid secretion is normal or excessive, for when a carcinoma develops on the site of an old ulcer, hyperchlorhydria may persist for life. A decision can only be made after continued observation. The demonstration of occult blood in the feces is of great importance.

Sarcinæ and yeast cells are often seen microscopically. Sarcinæ thrive best in the presence of hydrochloric acid and when found in the gastric contents are suggestive of benign stenosis.

Malignant stenosis is characterized by the presence of the lactic acid bacillus of Oppler-Boas, a sign which is almost pathognomonic. However, the demonstration of these bacilli alone should never be made the basis of a diagnosis, as deception is possible.

XUM

Roentgen ray examination should never be neglected. In all doubtful cases the presence or absence of a tumor can be rapidly established by means of it, and if a tumor is found to be present the case can be referred to the surgeon at an earlier date than would have been possible with any other method of examination.

The most difficult problem the diagnostician faces is early proof of the benignness or malignity of the underlying affection. This is important because the therapy depends upon it. In case of malignity, nothing but its early recognition can save the patient. We should endeavour, therefore, to arrive at as early a decision as possible by resorting to all applicable methods. Unfortunately, our knowledge and methods of examination are not sufficiently advanced to enable us to make an early and reliable diagnosis with absolute certainty.

The difficulties are least in the presence of a primary pyloric carcinoma. The rapid increase of the stenosis, the accompanying severe mucous catarrh of the stomach, the presence of lactid acid, deficiency of hydrochloric acid, the presence of the Oppler-Boas bacillus, rapid loss of weight, increase of stagnation in spite of careful dieting and regular lavage, occult blood in the fæces, and above all, the demonstration of a pyloric tumor, should secure a prompt diagnosis. But even if no tumor can be felt, a negative diagnosis cannot be safely made without an *x*-ray examination. Explorative laparotomy does not always admit of a definite decision as to whether there is carcinoma or not.

A secondary carcinoma which has developed on the side of an old ulcer presents insurmountable obstacles to an early diagnosis. Knowing as we do that an ulcer very frequently undergoes carcinomatous degeneration (Mayo), early operation is urgently to be advised.

The treatment of gastric retention is at first always internal; it would be a great mistake to refer every case to the surgeon. The most important point is the diet, which will vary according to the degree of acidity of the stomach contents and the chronicity of the affection. Meat is practically undigestible in cases of anacidity. Since it is impossible to supply sufficient water for the body's wants by way of the mouth, it is advisable to give small saline enemas several times in the course of the day, or to introduce water through the rectum by the drop method. Lavage is the sovereign means of unloading the stomach, removing fermentation, and decreasing the catarrhal condition. The irrigations should be carried out very thoroughly, for they frequently improve the ap-

petite and stop the vomiting. Cohnheim's oil treatment is often attended with excellent results. In benign stenosis, surgical intervention should never be resorted to until the patient has been given the benefit of the oil cure. The latter will also favourably influence hypersecretion. Wearing a well fitting stomach binder will give patients great comfort, as it will afford support to the enlarged stomach, facilitating its evacuation.

If in spite of rational treatment, including the dietary, irrigations, etc., retention cannot be influenced; if the urine does not increase in quantity, if there is loss of weight, and if no improvement is obtained either by the rest cure or by the oil treatment, then operation should be advised, even in cases of benign stenosis. Surgical intervention is absolutely indicated as soon as malignity is discovered, unless there be marked metastasis or the tumor has attained to such proportions as to frustrate every hope of success by radical operation. Unfortunately, the idea held out by some surgeons that with the performance of laparotomy the whole situation is cleared up is absolutely wrong, for carcinoma cannot with certainty be distinguished from an inflammatory tumor without the microscope. As a matter of course, early operation should always be advised in suspicious cases.

I have used Einhorn's pyloric dilator with remarkable success in one case of retention due to benign stenosis. The patient was a man forty-eight years of age. He had been sick nine years. For the last five years the great discomfort he experienced compelled him to wash out his stomach frequently. Pain, and sometimes vomiting, would come on about two hours after meals. At times he would vomit enormous quantities of food that he had taken days before. He had lost thirty pounds in weight; was tired quickly; had backache and was constipated. His stomach contents showed stagnation, with hyperchlorhydria. No Oppler-Boas bacilli could be found, but there was an abundance of sarcinæ. The fæces contained no occult blood. The use of the pyloric dilator brought about an apparently complete recovery. The dilator was used only three times during twelve days. The patient improved so rapidly that it was unnecessary to do any more stretching of the pylorus. He regained his weight and strength. It is now eighteen months since the last stretching.

The pyloric dilator consists of a thin rubber tube eighty centimeters long, with a small metal end-piece. Next to this metal piece and fastened to it and the tube, is a tiny rubber balloon covered with silk gauze. The portion of the tube covered by the balloon

XUM

is perforated in several places for the passage of air into the balloon, and at the upper end of the tube there is a stopcock and a graduated glass syringe, the latter for inflating the balloon. The balloon being emptied of air, the cock is closed. The end-piece of the dilator is dipped into warm water and introduced into the patient's pharynx. The patient drinks some water and the dilator moves into the stomach, where it is left undisturbed over night. In the morning, the balloon being now in the duodenum, the stretching is performed. The balloon is first inflated, and as the tube is drawn upward and forward there is a sensation as if the end of the dilator were held tight by something that drags along with it. The balloon is then slightly deflated by drawing on the piston of the syringe. This is done repeatedly until the end of the dilator passes upward through the pylorus.

Bulletin No. 18 of the Australian Bureau of Census and Statistics treats of the subject of smallpox and vaccination. From statistics which are given of 46,136 cases of smallpox which occurred during various epidemics in the United Kingdom, it is seen that the death rate among the unvaccinated was over three times as great as that amongst the vaccinated, but the number of vaccinated persons attacked was three times as great as that of the unvaccinated: this is probably due to a large extent to the preponderance of vaccinated persons in the community. In Japan, where vaccination has been rigidly enforced since 1885, 79,806 cases of smallpox occurred during the years 1896-1910, and the death rate was 29 per cent. So far as the effect of vaccination upon the severity of the infection is concerned, the figures given show that while in unvaccinated cases 73 per cent were severe, in vaccinated cases this was true of only 17 per cent., that is they were coherent or confluent cases. The figures given, however, are insufficient to allow of any positive deduction. The rate of attack with smallpox seems to vary with age, being much greater with persons under ten years. In England and Wales, the deaths due to smallpox during the thirty-five years elapsing between 1876 and 1910 numbered 30,349; the deaths from chicken-pox during the same period numbered 3,800, and those from cow-pox and other effects of vaccination, 1,309. The Bulletin also contains comparative statistics of deaths from smallpox, measles, and scarlet fever in various countries during the period from 1881 to 1910.

PYLORIC SPASM

By Charles G. Stockton, M.D.

Buffalo

NOT many years ago it was often asserted that there was no proof that there existed a definite physiologic disturbance producing spasm of the pylorus, except in cases of stenosis, pyloric ulcer, cancer or inflammation. To-day we have sufficient evidence that there occurs functional spasm of the pylorus, with or without local structural disease at that point.

This paper deals with: first, the nature of pyloric spasm; secondly, the symptoms of pyloric spasm; the meaning and interpretation of these symptoms, as to whether the spasm has a local or a remote exciting cause; thirdly, the treatment of pyloric spasm; referring not only to relief of the spasticity, but to the removal of causes that excite it.

The Nature of Pyloric Spasm

The circular muscle fibres of the pylorus exercise a sphincter-like closure of the gastric outlet, as the similar muscle fibres at the cardiac orifice act to close the inlet of the stomach. Experimental studies show that there exists in the walls of the stomach an inherent myogenic power of contraction, even when all the nerves going to the organ have been severed, perhaps through the action of the contained ganglia and nerves; but these studies also show that under ordinary physiologic conditions, the contraction of the stomach including that which is shown in peristalsis, and especially that shown in the vigorous contraction which closes respectively the cardiac and pyloric openings, are produced through nerve impulses passing down the vagi. Asosciated with the contraction of the muscle layers of the stomach is muscle tonus. Although allied, contractility and tonicity are not identical. They appear to bear the same relationship to each other in the stomach that exists between them in the muscle of the heart.

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XUM

The stomach in health possesses the power of marked tonicity and remarkable contractility; yet, under ordinary stimulus, only moderate manifestations of this power are observable. In health, during gastric digestion, the contraction of the cardiac opening of the stomach is practically continuous, while the pyloric contraction is intermittent. The intermittent relaxation of the gastric outlet during digestion is partly in response to the presence of an alkaline content in the duodenum and an acid content in the stomach.

Under these states of chemical reaction the pylorus relaxes and permits the discharge of acid stomach contents into the first part of the duodenum. When this has occurred, the so-called duodenal reflex is excited, and the pylorus contracts and closes. Having recognized the actual presence of this reciprocal mechanism there is a temptation to explain it as being merely an illustration of the antagonism that exists between the sympathetic and autonomic nerves. That there is really such a physiologic antagonism is generally admitted. This conception has been strengthened by recent physiologic experiments. The question was ably discussed by Dr. Barker before the Association of American Physicians in 1912. In Germany, Eppinger and Hess, among others, have attempted to show how to apply the knowledge gained by the experimental use of drugs to the relief of pathologic conditions in which there occurred a disturbance between the action of sympatheticotonic and vagotonic nerves.

It is a fascinating subject, and it would be of practical importance, if we could be sure that the conclusions reached were safely grounded. As relates to the behaviour of the pylorus, it would be important if we could know that it relaxes in response to sympathetic nerve stimulation, and that it contracts in response to vagus nerve excitation. A review of the evidence indicates that these are actually the facts; but, unfortunately for a vacation state of mind, not all the facts. The influences controlling the movements of the pylorus are complicated and some are not yet understood. However, something is gained by recognizing this antagonism in nerve action.

Let us suppose that by the entrance of acid chyme into the duodenum, a reflex excites the pylorus to close, and that in this contraction, the action of the vagus nerve is involved. Let us suppose that in the absence of chemic stimulus in the duodenum, the sympathetic nerves act to relax the pylorus.

Now, admitting these facts, what causes pyloric spasm? What occasions functional block to the onward flow of the ali-

mentary stream? The answer may be general, or it may be somewhat specific. In general, the cause of pyloric spasm is anything that will excite exaggerated spasticity of the pyloric sphincter; either over-spasticity inherent in the muscle or communicated to it through over-irritation of vagotonic nerve fibres. Specifically, pyloric spasm may result from over-acidity of gastric contents; that is, long-continued over-stimulation of the duodenal reflex. This is particularly true when at the same time there exist exposed nerve endings, from some local disease at the pylorus or duodenum; such as erosion, fissure, ulcer, inflammation, or infiltration. These conditions may suffice to produce spasm even without the assistance of the acid gastric juice; in other words, when there is only moderate acidity present, or none at all. The combination of circumstances most perniciously successful in inducing the spasm is an irritable lesion, for instance, peptic ulcer, duodenal or pyloric, aggravated by the action of gastric juice rich in hydrochloric acid and enzyme, pressed onward by over-vigorous gastric peristalsis.

When there is duodenal ulcer, or cancer, or acute duodenitis, the part is extremely resentful to the effect of acid chyme. This is readily understood. However, pyloric spasm of intensity and persistency equal to that produced in duodenal ulcer may be observed when there is no local lesion at the duodenum or pylorus. How occasioned? Often it is from cholecystitis. The reason is self-evident. When the duodenum is stimulated by the presence of acid chyme, the gall-bladder is excited to activity. An inflamed gall-bladder may sleep if undisturbed, but it is like an angry beast when roused. It seeks to obtain rest by exciting a vagotonic spasm of the pylorus.

Yet there are many other causes of spasm; with some the *modus operandi* is similar to that just described. Thus pyloric spasm is excited by cancer of the small or large intestine, by enterocolitis, appendicitis, cecal stasis, etc. These several causes of the condition are readily understood, and further explanation will be omitted, it being evident that over-spasticity of the pylorus at times results from irritation arising outside the digestive tract. I have met with it in cases of stone in the bladder, in uterine retrodisplacement and in nephritis. Also, although more rarely, it follows eyestrain, psychasthenia and nervous shock. So much for the nature of pyloric spasm; now as the second point, viz,—

XUM

The Symptoms of Pyloric Spasm and their Interpretation

Not only do we need to recognize the presence of the condition but we should seek to locate its point of inception.

The symptoms vary in intensity with the degree of spasm and gastric tonicity. When these occur with moderate intensity there may be experienced only an unpleasant sensation of pressure or tension in the epigastrium. There usually is produced a sort of sympathetic motor disturbance at the cardia; it also may contract too forcibly, or instead of persisting in its closure, the cardia relaxes from time to time, thus allowing the upward discharge of gas or other stomach contents. This is the origin of the eructation and regurgitation which the patient supposes to depend upon gastric fermentation. He describes these, and the physician too often accepts the interpretation as evidence of too much gas and too much acid. Such interpretation is often erroneous; fermentation is usually not present. One may suffer from gaseous eructation or from heart-burn without the presence in the stomach of an abnormal amount of either gas or acid. There may be no fault in gastric chemistry, no more gas than is usually present, and yet the disagreeable eructation and water brash occur. The fault is here a purely motor disturbance and, although the result of an overpatulous or over-irritable cardiac orifice, the trouble often is initiated at the pylorus and in the pyloric third of the stomach, the result of spasm and excessive tonus.

Although these events, belching of gas and sour stomach, may occur without unusual stimulus by gas or acid within the stomach, it is well known that when fermentation and abundant gas formation, or a high degree of acidity, are present in the stomach, there is ordinarily set up motor disturbance and belching of gas and water brash are experienced. However, even here the *modus operandi* is through the motor mechanism. There must occur the relaxation of the cardia for the escape into the esophagus of gas and of the sour contents. Heart-burn is usually caused by a stomach contents regurgitated into the esophagus.

While gastric over-acidity often sets into operation the cardio-esophageal symptoms here described, this same over-acidity leads to pyloric spasm. The pyloric spasticity may result from too great stimulation of the pylorus by the acid, or by unusual excitation of the duodenum and consequent reflex closure of the pylorus; the degree of intensity in pyloric contraction corresponds to the extent of the over-stimulation, or to over-excitability, or both. Of course,

the reflex would be greatly increased in case there is an irritable lesion in the pylorus or duodenum.

The symptoms of motor disturbance of the stomach, without excessive acidity and without a lesion in the vicinity of the pylorus, are of moderate intensity and, save when taking place in a neurotic or hyperesthetic patient, occasion symptoms that are of small importance. These symptoms are intensified in case of hyperchlorhydria, and they become almost unbearable when there are present both an irritable pyloric lesion and hyperchlorhydria. It usually, but not invariably, happens that with an irritable lesion there is also hyperchlorhydria. This is partly owing to the fact that pyloric spasticity produced by the lesion, for instance, peptic ulcer, prevents the escape of the acid chyme, and leads to over-acidity and Reichmann's syndrome.

Now to examine more critically the symptoms as produced by various degrees of pyloric spasticity, it will be found that they usually correspond with the intensity of the local irritation. It will be found that there is merely an excitable motor state of the stomach, there results but moderate discomfort. This takes the form of a sense of fulness relieved by belching, or occasional sourness relieved by a simple carminative.

When there is hyperchlorhydria, there is felt not only the sense of fulness in the epigastrium, but a burning sensation, a feeling of pressure, at times somewhat painful; there may be functional disturbance of the heart or liver, with constipation and headache. The symptoms are not so readily overcome; in fact it may require much attention to diet and the taking of antacid remedies in full doses in order to procure relief.

When there is an active ulcer at the pylorus or duodenum, with over-acidity, there is set up spastic closure of the pylorus of such intensity, gastric tonus of such extent, that peristalsis is halted, that the upward discharge of stomach contents ceases. The pyloric extremity is, as it were, pinched by its own contraction. There is marked distress and localized pain. Often this is not experienced until an hour or more after meals, when the acid gastric juice escapes into the duodenum. This has been called by Moynihan "hunger pain," and by surgeons is regarded as very diagnostic of duodenal ulcer. It is diagnostic of duodenal ulcer when that lesion induces pyloric spasm. The pain is produced by the spasm directly and by the ulcer indirectly. Anything that will produce intense pyloric spasm may give rise to the so-called "hunger pain." This symptom, therefore, has not the certain diagnostic value of duodenal ulcer which is commonly attributed to it.

XUM

It may occur without duodenal ulcer, and conversely, duodenal ulcer may occur without "hunger pain." There exists to-day an exaggerated idea of the importance of the symptom as an indication of duodenal ulcer, and a misconception as to its nature and origin. These facts may be verified by an unprejudiced analysis of cases, by avoiding leading questions in anamnesis, and by the observation of the results of operations and autopsies.

When pyloric spasm is set up by irritation of the gall-bladder or appendix, the symptoms of gastric motor derangement, including pyloric spasm, are more apt to occur soon after meals than is true when these symptoms follow ulcer of the duodenum or pylorus. This, however, is not invariably the case; the pain excited by gall-bladder or appendix may be delayed two hours or more after eating.

Pyloric spasm and the pain that it causes is often promptly relieved by eating. Dr. Crile says, "The man who carries a cracker in his pocket has duodenal ulcer." This is a capital epigram, but like most epigrams needs serious modifications before it is religiously applied.

We are so much interested in observing the most striking manifestations of pyloric spasm (for instance, as they occur in duodenal ulcer, and particularly the symptom of "hunger pain") that we are led to overlook the numerous cases in which there exists pyloric spasm of minor degree. But it is well to recognize pyloric spasm; it is usually fraught with meaning; however, it may mean widely different things, that is, it may be produced from irritation arising in divers regions. The confusing side of the matter, the difficulty of deciding upon the presence of pyloric spasm, depends upon the facts that the symptoms which the condition produces are not uniform. Here is a list of some of the most important manifestations: pain, epigastric tenderness, sour stomach, gaseous eructations, vomiting which may become incoercible, a sensation of pressure or painful tension in the epigastric region, a definite area of resistance on palpation (located at the pylorus where it assumes the form of a small tumor the size of a walnut, or over the lower part of the stomach, where it produces a rather firm but elastic resistance at the costal arch, especially between the left costal border and the median line).

A peculiarity of this resistance is, that, whether in the form of a pyloric tumor, or a more general resistance caused by gastric spasm, it may be felt to relax occasionally under the palpating hand. When this relaxation occurs the symptoms subside, to recur on the reappearance of the resistance or tumor, which in-

dicates the return of spasm. This physical sign is very significant and useful in physical diagnosis.

The vomiting produced by pyloric spasm varies in type. It may be persistent when not only the aliment is rejected, but painful retching may occur with the ejection of watery mucus, often highly acid and sometimes containing brownish particles of blood pigment, or free blood occurring in streaks or specks.

Of diagnostic importance is the prompt disappearance of the symptoms with the subsidence of the spasm. The reason that this relation of cause and effect is not oftener noticed lies in the fact that the irritability of the pyloric end of the stomach is so great that slight causes are sufficient to reëxcite the spasm when it has subsided. A state of gastric relaxation must continue for a time before the patient recognizes that a calm has followed.

By patient bedside study, by long continued, careful palpation, the physician may convince himself of the relationship that exists between the spasmodic state of the stomach, and the pain, vomiting, regurgitation and sense of pressure which this spasmodic condition produces.

I need scarcely say to physicians that in the symptoms here described we recognise familiar symptoms of appendicitis, cholecystitic, duodenal and gastric ulcer, duodenitis, gastritis, as well as functional hyperchlorhydria, perhaps the outcome of eye-strain, nephroptosis, pelvic disease, etc. It is well for us to understand in what manner these symptoms are produced; for then we may better interpret their meaning and perhaps the more easily overcome them.

The Treatment of Pyloric Spasm

First as to that treatment which is directed towards removing the underlying condition. Of course, this may often mean surgical intervention; i. e. an appendectomy, a cholecystostomy, or a gastro-enterostomy. However, the immediate need of such procedures may seem less when the precise and imminent cause of the symptoms is apprehended.

The remarkable efficiency of the prescription known as the "gastric sedative" in various types of irritable stomach is readily explained when we recall the nature of pyloric spasm. We may better understand the reason of the relief that ensues upon a clyster of chloral and bromides, or upon a "hypo" of codein, if we keep in mind the nature of pyloric spasm. Thus also may be found an explanation for the beneficial effects of hot fomentations or applications of ice.

XUM

Secondly, the treatment aimed at the immediate and direct relaxation of the spasm. There are as yet but few remedies known to us that act especially upon vagotonic fibres of the pneumogastric to induce relaxation. Even these few have other and more general effects. However, we may employ some of these for their selective action and, temporarily, disregard their other action. Of course to some extent we act from this point of view when we employ antacids and anti-spasmodics, not to mention anodynes and heat or cold. Yet there remain a few agents that may be used rather more specifically. One of these is atropine in full doses. This drug, in a proportion of cases, by exercising an inhibiting effect upon the pneumogastric, cuts out the vagotonic element in the pyloric spasm and relieves the condition as by magic. Another agent I have been led to try experimentally and, in a number of cases, with remarkably satisfactory results: that is *adrenalin*. The physiologists have found in animal experiments that adrenalin brings about an instantaneous although rather brief relaxation of the stomach, making it for the time being atonic, except that it seems not to effect to the same degree the sphincters of the pylorus and cardia. Notwithstanding the exception, I tried adrenalin hypodermically in a case of painful pyloric spasm; the relief was quick and, somewhat to my surprise, lasting. Since then I have repeated the trial in several cases; it has not uniformly succeeded, but in most, and these the most characteristic, it has given complete relief. In two the spastic pylorus was palpable and the tumor could be felt to melt away under my hand in a most gratifying manner, and coincidently the symptoms disappeared.

Before closing I should refer to the happy effect of prolonged gastric lavage, using water at the temperature of 105° F., in relieving spasmodic conditions of the stomach. It is not universally successful; but, for that matter, in therapeutics, what is?

THE annual meeting of the medical staff of the Regina General Hospital was held October 27th. The election of officers resulted as follows: president, Dr. S. E. Moore; vice-president, Dr. W. S. Coles; secretary-treasurer, Dr. O. E. Rothwell.

ON SOME CLINICAL ASPECTS OF GASTRIC DISEASE

By C. F. Martin

WHILE the evolution of our knowledge of gastric disease has undergone great changes in recent years, its successful practical application has scarcely been commensurate with the time and energy spent.

It is, of course, obvious to anyone who has followed the recent literature, that our conception of the stomach, in its anatomical relations, its physiological functions, its pathology and therapeutics, has been subjected to considerable change. Sadly enough in treatment—medical and surgical—our advances have been relatively small.

Anatomical Considerations.—As everyone knows, we have added to our understanding of the position, size, and shape of the stomach: we have discovered that they are normally subject to great variations, and, in consequence, we should not overestimate the importance of many of our usual methods of physical examination.

Although Peplick in 1499, and Magnus Hundt two years later, had already dwelt on the vertical position of the stomach, centuries elapsed before the fact became widely recognized. To-day, by means of the fluorescent screen, we can see the normal stomach lying not transversely, nor obliquely, but vertically in the left hypochondrium, with an air space above, a narrow elongated, tubular, intermediate space, and a lower horizontal portion occupied by the contractile antrum and the pylorus itself. This may be called its vital position, or *functional* anatomical position, one which is seen only in the closed living body. Once the abdomen is opened, the picture changes and the anatomist, the pathologist, and the surgeon gain a different and, I think, erroneous view of the functioning viscus. For this organ, while at work, is not a hollow organ ready to receive food impassively, but is merely a *virtual* cavity with closely apposed walls that dilate to form a cavity only when the need arises.

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XUM

We have been accustomed, too, to think of its position in relation to the umbilicus and xyphoid, but here, again, our Roentgen pictures reveal a fallacy. The umbilicus, depending for its relative position upon the shape of the diaphragm and the conformation of the abdomen generally, is altogether too variable a point for accurate mensuration. The limits of the healthy stomach, moreover, extend much lower than the navel; indeed, we are now so accustomed to its position low down, sometimes almost lying within the pelvis, that we have come to regard the mere position as, in most instances, nothing but a clininal observation and not, per se, an evidence of disease.

If it be true that the stomach be vertically situated, and its normal position variable within such wide limits, our views of gastroptosis must correspondingly change. The old term "vertical stomach" or vertical ptosis of the fish-hook variety, or "crescentic type," explain conditions really not abnormal. I mention this, because clinicians differ so widely in their views on gastroptosis. In those cases where the greater curvature lies unusually low, the predominating factor to consider is the atony, not the ptosis. Many of the French school deny the common existence of ptosis entirely, claiming that in men, at all events, it is never seen, though in multiparous women, with flaccid abdomens, it may not be uncommon. Barret, of Paris, declined to make the diagnosis unless with the fluorescent screen and with his patient in the right lateral decubitus, and defined only such conditions gastroptosis where the greater curvature was separated from the dome of the diaphragm by two inches, or more. To others, again, ptosis means the swinging down and to the left of the middle and pyloric portions of the stomach, and carrying along with it the first part of the duodenum, thereby increasing the vertical length of the viscus.

Mensuration of the stomach, at best, is very unsatisfactory and its position, size and shape vary so much even in the *same individual* at different times that not even a satisfactory average can be accurately given. The size of the stomach, moreover, gives no clue to its functional powers, nor to its pathological condition, a fact which drives us to the conclusion that the ordinary efforts to outline the stomach (percussion and auscultatory percussion, clapotage, and artificial inflation) are methods of examination with but relatively small practical interest to the clinician.

Increasing knowledge convinces one of the importance of functional over anatomical features. The stomach, be it ever so large or long, is not a pathological one so long as the motor power is good.

To gastroptosis are accredited all the ills that abdominal viscera inherit, though probably the cause of none. The success of varied treatments demonstrates this. Patients in whom the diagnosis of gastroptosis is made, improve perhaps on rest, at other times on exercise; cure sometimes follows travel and enjoyment, while at others the success of the treatment is accorded to restrictions, belts and corsets. Some are healed by vaccines, and in a few rare instances despite the intervention of the surgeon. The ptosis per se with good motor power is a negligible factor in disease, and where it exists with dilatation, it is the motor insufficiency which remains as the predominant feature.

Apropos of this question of size and function, I think one should carefully distinguish between atony and motor insufficiency. An atonic stomach examined by the fluorescent screen fills like an inert vessel, the bismuth falls down to the lowest portion, but if the antrum pylori is normal, the food will be sent on to the duodenum within the natural time. In other words, a certain degree of atony does not imply motor insufficiency.

Dilatation is to be defined as a motor insufficiency without regard to size, relations, volume, clapotage, or retraction. (It is in these dilated stomachs, too, that we get biloculation, not a true hour-glass stomach, but a shape due merely to traction on the vertically placed overloaded stomach, and that this is no true hour-glass contraction can be demonstrated with the hand, and pushing the stomach up when its non-bilocular volume and shape will be evident. Operation here is obviously uncalled for.)

The kinking, too, at the pyloric antrum which accompanies the crescentically shaped and lowered viscus, does not of necessity imply motor insufficiency. Atony of the fundus may exist while yet the contractions of the antrum may be sufficient to expel the food within the normal time. Even then though such a deforming kink is present, there is demand for remedial measures and surgeons should beware of trying to improve a condition, which, after all, is a functionally normal one. Surgical interference here adds but a complication to the symptomatology, and renders matters worse instead of better. That the clinical importance of estimating motor insufficiency is more and more acknowledged, is attested by the wealth of its literature in very recent times.

What methods are we to employ to determine motor power? And how attain accurate estimates of the efficiency of the stomach to propel food on its digestive way?

The number of the tests is legion; each specialist has a method

XUM

of his own, and while to each a special virtue is attached, there seem no newer ones of such value as to replace those already long in use. Some use water, others oil, some use this, that, and the other food. Some tests make too much, others too little demands on the power. In some the very meal employed inhibits peristalsis and interferes of itself with our estimate. In others again elaborate chemical analyses are made to determine with greater accuracy the amount of food which the stomach has prepared.

To find after a Riegel dinner at night that food contents do, or do not remain next morning, gives one sufficient knowledge as to whether or not continuous retention exists, while the Boas test breakfast informs us of minor degrees with an accuracy that is complete enough for all our practical needs. Other methods bring us no farther in our diagnosis. Take for example the efforts recently described in advocacy of the Bourget-Faber meal with gruel, mince-meat, bread and butter, prunes and cranberries. The advocates of this test classify their cases according as there exists a five-hour, six, eight and twelve-hour retention of 10 c.c. contents. Their conclusions are that where food remains twelve hours in the stomach, pyloric stenosis of the organic type is certain, *though they admit* that a spastic stenosis may also be present under similar conditions suggesting the presence of an ulcer, or gall-stones, or other irritant which causes spasticity. If remnants are found only after five or six hours, they diagnose organic disease, such as ulcer, cancer, or gastritis, *admitting, however*, the possibility of similar mild retention in any chronic gastric disease, hypersecretion in intestinal disorder, or even with general asthenia. In other words then, fallibility characterizes these newer methods just as in those long established.

Strauss' method, again, seems simple enough. The contents of the ordinary test breakfast are allowed to stand in a graduated cylinder for two hours. If the solid portion exceeds the liquid, there is motor insufficiency,—if less than one-half the total, hypersecretion. Zweig used the centrifuge for his estimation, while Elsner took no account of the liquid but drew his conclusions from the solid content alone.

A fallacy exists in all these methods, for we never know how successfully our test meals have been removed, and the relation of solids and liquids depends as much on mastication as on some other factors of digestion, while mucus, if present, adds to the volume of solids. Some tests of motor power depend largely on the secretory findings. In addition to the quantitative and qualitative ap-

pearance of the removed contents, it is of some value to establish the ratio between free HCl and total acidity. Relatively little free HCl suggests impaired motility, the acid being absorbed by the proteins, which are delayed in transit. But in these cases a total increase of secretion is present.

Ever since Bickel demonstrated that the percentage of HCl secreted in the gastric juice never varies, we have known that our clinical variations are dependent only on the total amount of juice secreted, the presence of mucus, and the rapidity with which digested food leaves the stomach. High ratios in free *and* in total acidity would then indicate impaired motility from whatever cause,—for it is always possible to find hypersecretion in association with functional as with organic disease—notwithstanding the teaching to the contrary.

An interesting observation of Sumner's which perhaps calls for confirmation is the marked difference in acidities of food contents aspirated from near the cardia and deeper down in the stomach, showing the graduated distribution of food and gastric juice.

Testing of the motor efficiency by the skiagram and bismuth meal affords perhaps as efficient a method as those already in use. Nevertheless, comparative tests of the bismuth meal test and that of Riegel, show discrepancies in the duration of the contents that are often surprising. Food of a meal has often passed the pylorus when in a corresponding time the shadow of the meal still shows on the screen, a fact attributed by some to the inhibitory action of the bismuth on the motor function, which if marked would certainly give a faulty notion of the pathological processes. Such an experience, it need scarcely be said, would be applicable only to the milder cases and could never be a feature of importance in stenosis, but here as with other tests it is only in the milder cases that our diagnostic difficulties arise.

I would suggest that any effort to determine with mathematical accuracy small degrees of motor insufficiency and to base thereupon a differential diagnosis, is apt to lead to faulty conclusions. It is admitted, in the first place, that the normal capacity of the stomach varies within wide limits, and with temporary overfilling, transitory indiscretions, and emotional disturbances, the motor power may easily suffer for a time, not only from day to day, but at different times on the same day. Early organic conditions bring about the same results and there is no means of estimating the causes according to the degree of mild retention.

Much has been recently observed, too, in studying the mode of

XUM

evacuation of foodstuffs, and with a very important bearing upon matters clinical. It has been found, for example, that 200 c.c. of water reach the intestines in ten minutes, but if bismuth gum be added, the duration is much increased. Any food, too, if added to the water, delays the propulsion of the water itself, an interesting observation which probably serves to explain why mineral waters should not be taken with meals if the complete effect is desired. For the same reason, too, many diuretic waters produce results more readily if given on an empty stomach, reaching the intestine earlier for absorption. For the same reason, too, their effect on intestinal digestion is more noticeable.

It is interesting in this connexion to observe that our tables of digestibility of food stuffs are to a very large extent based on their time of duration in the stomach, but in view of what has just been said, the error in this is obvious. The stomach has multiple functions, motor, chemical, osmotic and absorptive. Fluids which have no nutritive contents use the stomach as a mere transitory dwelling and demand only motor power from the organ. Milk, for example, remains in the stomach from two to three hours, an egg much less time, and yet stomachs which cannot digest eggs can often tolerate milk. Oil remains less long in the stomach than does milk, and yet stomachs which cannot endure milk, can perfectly tolerate oil. Many factors, indeed, determine digestibility, quite apart from the motor power. The food will not remain if it should be digested in the intestines, and if its volume allows it to pass the pylorus, nor, again, if it excites motor power and secretion enough to hasten it onward. Food, too, which perhaps remains but the normal time in the stomach may yet be undigested in the ordinary sense of the word. Levin *pere* in his interesting observations has demonstrated in detail the fallaciousness of such a test and the limitations in practice of these tables of digestion. Much more important, then, than the position of the stomach, is its ***muscular tone***, which, as has just been said, must be distinguished from its contractile power. Most of the contractile power of the stomach lies in the lower third, the antrum or pyloric end, whereas its tone may be described as the power to adapt itself to food and close round it after digestion. In the normal stomach one sees the food held in suspension in the upper zone of the vertical viscus, waiting to be grasped by the tubular portion which widens *transversely* as the food increases in quantity, and never allows the food to fall of itself to the lower portion. Where atony exists, on the other hand, the bismuth may be seen descending quickly to the bottom, and gradually filling up the stomach from below.

Cannon's experiments have thrown much light on the subject of gastric tone. Section of the vagi is immediately followed by paralysis of the muscular wall, but the subsequent addition of food to the stomach, brings about a recovery of peristalsis. Section of the splanchnics, on the other hand, brings no change. Section of both vagi and splanchnics induces paralysis, but after some days tonic contraction occurs. Now if we examine the stomach *in situ*, under salt solution, we find it sometimes flabby, sometimes contracted. Add food in each instance and in the one case the viscus remains flabby and receives the food impassively, in the second case we get peristalsis. The difference is not hard to explain. All peristalsis is preceded by a tonic state, with rising intragastric pressure, such as would be induced by the presence of food. Distension is then necessary as a stimulus; but distension alone is not sufficient (e.g., flabby, atonic state), for the muscle must be in a state to be stretched, i.e., the fibres must be shortened and resilient.

It is just here that the important function of the vagus system is demonstrated. The vagi prepare the stomach for receiving food by setting its neuromusculature in a tonic state, making it exert a tension, so that when the food enters, the viscus can contract upon it (peristalsis). Probably, therefore, the vagi adapt the size of the stomach to the varying amount of food. Tonus, therefore, is important. It supplies the resiliency that causes tension, so that contraction of smooth muscle-walled viscera occurs.

Rhythmicity of this contraction is due to the combined refractory stage during contraction, and the stage of irritability during relaxation; tonicity then is necessary for rhythmicity, and the lack of it, as in the atonic stomach, brings about motor insufficiency. Worry can bring about appreciably the same effect. Such are some of the results of Cannon's important research.

It has been suggested that the internal secretions have to do with these stimuli, some acting on one form of nerve supply, some on another. If, for example, we inject epinephrin intravenously, we get cessation of previous peristalsis, just as though the splanchnics had been stimulated, and if this is true of one internal secretion, perhaps some other secretion has its antagonistic effect, and different portions of the gland have even antagonistic results. The observation of Eppinger and Hess seem to bear this out, and they concluded that where an organ is supplied by both sets of nerves they act antagonistically. Smooth muscle cells whose double innervation is preserved in a state of equilibrium, maintain, therefore, a tonus, while disturbances of this equilibrium produce changes in tonus,

XUM

increasing it or inhibiting it, according to which nerve system predominates, e.g., while epinephrin acts on the sympathetic, atropin is its antagonist.

This question of motor power and contractility leads me to speak briefly of gastric ulcer and one of the more suggestive views as to its etiology.

Basing his premises on the work of Eppinger and Hess, Bergman has advanced a most interesting theory. The work referred to deals, firstly, with the action of the two antagonistic sets of nervous systems which supply the smooth muscle fibres of the abdominal viscera, the extended vagus and the sympathetic. If the equilibrium which ordinarily maintains tone be disturbed, it induces sometimes spasticity, sometimes flaccidity. Spasm of the gastric muscle is, of course, an obvious and frequent occurrence in gastric ulcer, and just as in spasms of any other smooth muscle tissue, so here it produces pain, e.g., a similar sequence of events occurs in vascular angina, in uterine disturbances, in gall-bladder inflammation, and so on. To a certain extent this might explain the local pain of gastric ulcer, but more than this, the local spasm produces ischæmia by constriction of the vessels of the mucosa and this in turn permits of autodigestion. Lichtenbelt's work bears out this possibility, and Payr has already proved to his satisfaction the circulatory origin of many simple cases of gastric ulcer.

Bergmann regards any vagal nervous irritant, or stimulus, as a cause of local spasm. This irritant, however, or stimulus, acts only under certain constitutional conditions,—conditions which give rise to stigmata of susceptibility to nervous stimuli. He draws attention to the fact that patients with gastric ulcer have many associated conditions which lead to this susceptibility, in other words, they show the symptoms of an abnormal reaction in the visceral system, e.g., hyperchlorhydria, spastic motility of the stomach, spastic constipation, pain, tremor, cold extremities, dermatographism, etc.

Again, this primary stimulus may be a disease, or may be psychic; sometimes appendicitis, sometimes stone in the kidney, precedes a history of gastric ulcer. Rössle who calls gastric ulcer "the second disease" bases h similar views on this theory and on the almost invariable antecedence of some primary cause, organic visceral disease, or psychic disturbance.

This fundamentally nervous origin of gastric ulcer suggests the need of some therapy by means of which spasticity is diminished, and the secretions inhibited, in order that thereby food may be

encouraged to pass on and the healing of the ulcer favoured. Atropin in fulfilling these requirements is warmly advocated—just as in the past—but now with reason founded on experiment.

Whatever be the etiology of gastric ulcer, certainly success has not followed its treatment in a very large proportion of cases.

Statistical evidence has never yet been reliable, for physicians have erred too often in their diagnosis, while the surgeons even with the abdomen exposed are not always—indeed cannot be always—certain of the presence of an ulcer. In many doubtful cases I think a gastroenterostomy is performed, and when no further signs of ulcer develop, it presumably adds one more to their records of success in this form of treatment. Indeed, it has sometimes been my experience that it is more easy to convince a surgeon, than the medical clinician or pathologist, of the presence of an underlying ulcer. Records which can show so many fruitless explorations where ulcer has been suspected, attest sufficiently to the difficulties in diagnosis, for while typical cases are easy of detection, a very large proportion present diagnostic problems of great difficulty.

I do not know if it is justifiable to regard exploration of the abdomen as a serious undertaking, but the physician who looks on his patients with a medical eye cannot fail to see a change; often the operation seems to have added years to their appearance, much of their former vigour has gone, and they are not always so resistant subsequently to the inroads of attack, be it on the viscera, or the nervous system. It would be wrong to decry exploration of the abdomen, but one would like to hear more surgeons repeat the aphorisms of one of our most distinguished colleagues who said, "The more I gather of surgical experience, the less I feel like operating."

X-rays:—The statement has been made that *x*-rays with the bismuth meal, have replaced laparotomies as a means of diagnosis for ulcer. The earlier view, however, that the bismuth shadow lingering in one localized portion was pathognomonic of simple ulcer, has too often proved fallacious. Bismuth does *not* remain in ulcers, unless they are penetrating, nor can other ulcers be thus diagnosed unless an actual deformity or stenosis exist.—Baetjer's interesting observation that in duodenal ulcers the stomach empties itself in twenty minutes is but an expression of hypermotility, and though doubtless a valuable adjunct to diagnosis, is perhaps not infallible.

With reference to the medical treatment of gastric ulcer, I would merely like to draw attention to one feature. I refer to

XUM

the short duration of our so-called cures, and our apparent indifference to detail. When we consider the unfavourable conditions under which an acute simple gastric ulcer exists and is expected to heal, with irritants of all kinds, motor, mechanical and chemical, interfering with its rest, surely four weeks is but a very short time in which to set our dietetic restrictions. This, I think, may explain to some measure our failures, for success seems more certain the longer the cure is maintained. Suitable rectal alimentation for longer periods, then suitable bland and soothing diet for many weeks, might possibly be productive of healing, at the same time continuing in larger doses over a longer period the drugs which alleviate and soothe, and act efficiently on the etiological factors. Repeated examinations of the stools for occult blood should be persisted in for months before the patient should be allowed to feed indiscriminately.

One might reasonably expect by this means to obviate the necessity of subsequent surgical interference, for if, as our autopsies show, many unsuspected gastric ulcers heal spontaneously, surely with careful medical treatment we might reasonably expect like results where we are previously warned of their existence.

As a physician I do not feel competent to discuss the surgical aspect of gastric ulcer, but I think that experience teaches everyone that the surgical treatment of this disease is still far from satisfactory. No one will deny the remarkable results which are achieved in very many patients on whom gastro-enterostomy has been performed, but the enthusiasm with which some surgeons advocate the indiscriminate use of this method of treatment in all cases of chronic gastric ulcer, and their zeal to perform the operation, can, I think, only be due to their inability to see the results. A careful analysis of these cases has indeed never been made, by which I mean that the cases have been insufficiently classified to satisfy us with proofs as to where the selections should be made; the tendency is becoming more and more to regard only those cases where marked stenosis exists as being satisfactory in their result, for it is astonishing how many patients upon whom this operation has been done indiscriminately, require either further medical treatment, or renewed operations. If the surgeons do not hear of these cases, certainly the physicians do.

If, indeed, the operation be performed where stenosis exists, or in case of a chronic fibroid ulcer, a complete artificial stenosis of the pylorus is created, and if the short circuit be so placed that not the fundus but the antrum is selected for the new opening, no

doubt results are very much superior to those in which indiscriminate operations are performed. But where operations are recommended, no matter where the ulcer lies, on the basis that perforation or fatal hæmorrhage may occur, or that such conditions may lead to ultimate ulcer, I do not think that one would find satisfactory results except in a very small proportion of cases. Examine, if you will, by the fluorescent screen to see what becomes of the new opening, and one will find wherever the pylorus is patent food will pass through its accustomed passage rather than through the new opening. Small wonder then that Mr. Lane scoffs at the idea of gastro-enterostomy, and prefers a short intestinal circuit of his own.

In conclusion I would like to suggest that in preference to limiting the means of diagnosis to one or two special methods, such as *x*-rays, or exploratory laparotomy, or the newer and more elaborate chemical estimations of the motor power, that the surgeon and physician should jointly consider every point of view in diagnosis, before urging a radical cure of a disease that, after all, may not exist.

THE next award of the Alvaringa prize of one hundred and eighty dollars will be made by the College of Physicians of Philadelphia on July 14th, 1914, provided an essay is submitted which, in the opinion of the committee, is worthy of the award. Essays may be upon any subject in medicine, but they must not have been previously published and they must be typewritten, either in the English language or accompanied by an English translation; they must be in the hands of the secretary, Dr. Thomas R. Neilson, 19 South Twenty-second Street, Philadelphia, on or before May 1st, 1914.

XUM

FRONTAL TUMOURS*

By R. W. Mann, M.D., C.M.

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THE symptoms of any case of intracranial neoplasm may be classified into (1) general, due to increased intracranial pressure, and (2) local, depending upon the part of the brain affected and due to a disturbance in function of the particular region attacked. The general symptoms include headache, vomiting, optic neuritis, vertigo, and mental failure. When accompanied by a history extending over several weeks or months the general symptoms are usually sufficient to establish the diagnosis of an intracranial tumour. It might be mentioned in passing that Bright's disease, lead poisoning, and the severe anæmias have sometimes been confused with brain disease on account of the headache, vomiting, dizziness, and retinal changes which may manifest themselves.

After a general diagnosis of brain tumour has been made the exact position of the growth should be determined if possible, and in order to do this we depend upon the local or localizing symptoms. As indicated above, these localizing symptoms vary according to the region attacked, and their value depends upon our knowledge of the anatomical seats of the various functions. When certain parts of the brain are diseased there are no definite symptoms to indicate a disturbance of function. These parts, the functions of which are obscure or not easily investigated, are usually known as silent areas. When any one of these silent areas is the seat of a tumour we must attempt to form a diagnosis by a careful consideration of the history of the case and by the elimination of all regions which seem to be unlikely sites. In some cases the per-

*From the service of Dr. H. B. Anderson, St. Michael's Hospital.

version of functions occasioned in neighbouring areas may be easy to recognize, and may at once suggest a certain silent area as the primary seat of disease.

The frontal lobe is usually included amongst the silent areas, and this obviously implies that disease of the frontal region may be exceedingly difficult to recognize. In the frontal lobe we include only the region anterior to the præcentral sulcus. Since the higher intellectual functions are known to have their seat in this region it might be natural to expect an early mental change in any case of frontal disease. In some cases we do find a noticeable change in conduct, with loss of the power of orientation, morbid fears, anosmia, insomnia, amnesia, illusions, hallucinations, delusions, etc. In other cases remarkably few signs may occur.

Edwin Bramwell reports a case of a large glioma of the right frontal lobe, which was repeatedly examined during life by competent observers. No localizing clue was obtained until just before death, which was sudden. There was no anosmia and no discernible mental change, with the exception of some irritability of temper. For the four years previous to death the patient had been the subject of general epileptic seizures. In four cases reported by Bruns there were symptoms of cerebellar disease, such as vertigo, lurching, hypotonus and weakness of muscles on the side of the lesion, tremors, incoördination and nystagmus. In addition there was some degree of paresis of a hemiplegic or monoplegic character on the opposite side of the body.

In five out of twenty-four cases reported by Dr. S. A. K. Wilson, of the National Hospital, London, there were cerebellar symptoms. These cerebellar symptoms are usually said to be due to a backward pressure on the cerebellum, but Strümpell thinks that they are more likely to be due to involvement of the centre in the Rolandic area which presides over the movements of the trunk muscles. Dieulafoy quotes several cases in which there was no psychical or intellectual trouble whatever. He also quotes several cases of glioma and gumma of the first and second frontal convolutions, giving rise to Jacksonian epilepsy, and therefore suggesting involvement of the Rolandic area. In a summary of his remarks he states that we have no sign or symptom which will enable us to differentiate Rolandic from frontal Jacksonian epilepsy. It is evident that Dieulafoy considers disease of the frontal region capable of causing Jacksonian epilepsy, while the adjacent Rolandic area is still performing its functions normally.

It must also be remembered that in those cases which do not

show any definite general symptoms of pressure the intellectual changes which may be present are often very suggestive of general paralysis of the insane, or of the mental deterioration which may result from a prolonged use of alcohol. In these cases the Wassermann reaction, the results from the iodide, mercurial or salvarsan treatment, together with a careful enquiry into the history of the condition, are often helpful in arriving at a diagnosis.

The changes in the reflexes may be of great importance, not so much as a local manifestation, but as a general sign. The deep reflexes are usually accentuated. The plantar reflexes are frequently absent, or may be extensor in type. The abdominal and epigastric reflexes are often diminished or absent on the side opposite the tumour, and are specially important, owing to the fact that they are likely to be affected very early in the course of the disease. Presumably the reflexes are changed on account of disturbance in the pyramidal system.

After having located the position of the tumour in the frontal region, if that has been possible, the next point to decide is its probable structure. A positive Wassermann reaction or a marked improvement under treatment by salvarsan, mercury, or potassium iodide would naturally suggest a gumma or other syphilitic disease. A positive Calmette or Moro test would point to a tubercular focus, such as a solitary tubercle. The presence of disease in any other part of the body would indicate the possibility of the cerebral lesion being of the same nature. The age of the patient, the history, and the situation in the frontal lobe, would suggest certain varieties of tumours rather than others.

Varieties, with age, and positions in which they are likely to occur.

The following briefly summarises the tumours of the brain in their order of autopsical frequency:

1. *Glioma.* Is chiefly found in the cortex, pons, or medulla; occurs chiefly in the middle-aged or young. The majority of tumours which develop before adult life are glioma or tubercle.

2. *Sarcoma.* Sarcomata arise from the meninges, blood vessels, or bone; they are the most common type in adults. The majority of tumours after adult life are either sarcomata or gummata.

3. *Tuberculoma.* Is chiefly basal, and especially in cerebellum; it is by far the most common type in childhood.

4. *Gumma.* Mostly seen at base of brain or brain-axis. Very frequent in adults from thirty to forty-five. Not so often seen at autopsy, as it is the type which is preëminently amenable to treatment.

5. *Carcinoma.* Almost always secondary.
6. *Parasitic Cysts.*

The structure of the tumour, in addition to its location, having been determined, the question of treatment immediately arises. Syphilitic diseases are usually treated by potassium iodide, mercurial compounds, and salvarsan. For tubercular nodules, lumbar puncture and tuberculin may be tried in selected cases. For almost all other varieties of tumours operations should be performed if removal seems possible. In some cases, when the growth is not removable, it may be necessary to trephine, in order to prevent blindness and relieve vomiting and headache.

The following case is one which we recently had the opportunity of studying. The diagnosis of frontal tumour was made during life, but we experienced great difficulty in coming to a conclusion as to the nature of the growth. Before entering and after leaving St. Michael's Hospital, where our observations were made, the patient was under the care of Dr. W. D. McIlmoyle, of Bracebridge, Ontario.

The patient was a male; age forty; married; occupation, hardware salesman.

Complaint: headache, convulsions, and difficulty in walking.

Personal History and Previous Illnesses. He was born in Canada forty years ago, and had never lived outside this country. Some years ago he worked in a factory and at carpentry. For the last six years he had been a hardware salesman. He smoked excessively from youth, but always abstained from the use of alcohol. He had urethritis twenty years ago, but denied any syphilitic affection. Three years ago he had arthritis of the left knee. Some years previous to this he suffered from typhoid fever.

Family History. His father is said to have died of rheumatic fever at the age of sixty. The mother is living and well at seventy. Three sisters died of typhoid fever. One brother and one sister are alive and well. There is no history of tuberculosis or of mental or nervous disease in any member of the family, or relations.

History of Present Illness. The first symptoms began in June, 1912, when the patient's wife was wakened in the middle of the night by a noise, which she thought originated in her husband's throat. This noise was followed by a jerking of the limbs. On turning the patient on to his back he became quite still, and subsequently began to snore. He is said to have bitten his tongue during this attack, but not to have passed urine or fæces.

Early in August he had severe frontal and temporal headache

XUM

on both sides, more or less continuous, but somewhat worse in the mornings. At this time he also developed marked mental symptoms. These took the form of fits of depression, with crying, irrational talking, asking the same question several times, "sinking feelings," and loss of interest in everything. At the same time he began to experience difficulty in walking, frequently staggering and occasionally falling.

About the middle of September he had fits, in which the face became red, the legs stiffened, and the arms jerked. These lasted for from two to three minutes, and were followed by sleep with stertorous breathing. The attacks recurred several times a day, but with longer intervals between them as time went on. In many of the seizures the left elbow was held in a flexed position for some time. There was no biting of the tongue or incontinence. About the end of September the fits ceased, and the patient gradually became comatose, with occasional lucid intervals. As far as we are able to ascertain there was no rolling of the eyes or rotation of the head, as is common in frontal tumours.

When brought from Bracebridge on October 9th, and admitted to St. Michael's Hospital under Dr. H. B. Anderson, the patient was delirious and had incontinence of urine and fæces. The temperature was 97·4° F., the pulse 68, and respirations 20. The urine was normal. A Wassermann reaction was done by Dr. Gordon Bates soon after admission and several times subsequently with blood serum and with cerebro-spinal fluid. On every occasion the result was negative. An *x*-ray examination of the head revealed nothing abnormal. The ophthalmic report by Dr. H. A. McCullough was to the effect that there was well marked optic neuritis in both eyes, with loss of accommodation of the pupils to light. On account of the mental condition of the patient the accommodation of the pupils for distance could not be ascertained. Fifteen grains of potassium iodide, three times a day, were ordered, and this dose was continued while the patient remained in the hospital.

We first investigated the condition of the patient on October 21st, twelve days after admission. At this time he was quite conscious and appreciated his surroundings. He complained of loss of memory, and said that he frequently experienced difficulty in regard to orientation in time and place. He was very emotional, sometimes crying without provocation, and at other times exhibiting a vague restlessness and silly jocularity. Articulation, phonation and the quality of the voice were apparently unchanged. The

naso-labial furrow on the left side of the face was not so well marked as on the right. Sensation of the pharynx was dulled and the palate reflex was absent. On phonation the uvula moved slightly to the right. The tongue on protrusion moved slightly to the left. The grips of the hands were strong and equal. The legs also possessed good muscular power, and were apparently equal in size and

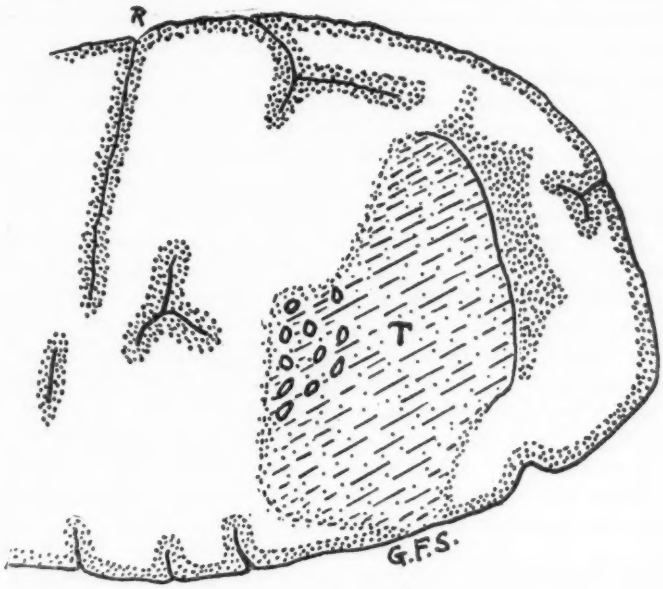

FIG. 1.—*Diagram made from a tracing of a Brain section.*

The section was made horizontally a short distance beneath the cerebral cortex, which had lost much of its convexity during the hardening process. The upper border of the diagram is on the outer surface of the right cerebral hemisphere, while the lower border is on the mesial surface. The dots represent the gray matter. T. is the tumour, which is bounded by indefinite margins, except anteriorly. The oval figures at the left of the tumour represent areas of gelatinous transformation. R. is the fissure of Rolando. G.F.S. is the surface of the gyrus frontalis superior.

strength. There was no spasticity in any of the limbs, but the gait was ataxic and Rombergism was well marked. There was no incoördination or tremor in the arms or hands. There was no jaw-jerk, and no tendon reflexes could be elicited in the arms. The knee-jerks were brisk and equal on both sides. There was absence of ankle clonus, and the plantar reflexes, when obtained,

XUM

were flexor in type. The abdominal and epigastric reflexes were well marked on the right side, but almost absent on the left. There was no sensory disturbance, except on the palate, as noted above.

On November 27th the patient was discharged from the hospital, partly because it was not certain that he was not suffering from a frontal gumma, which could be influenced by the medicinal treatment just as well at home as in the hospital, and partly because he had expressed himself as unwilling to undergo an operation in case it was decided upon as the proper method of treatment. During his stay in the hospital and for a few weeks subsequent to his discharge the improvement was indeed remarkable. From a state of delirium on admission he recovered to such an extent that he could talk quite rationally and walk without assistance. After his discharge he acquired a voracious appetite and at times had attacks of vomiting. The iodide treatment was continued to the end of the year 1912, when the previous symptoms of mental feebleness began to reappear. In the early part of January, 1913, the condition became rapidly worse. The patient died about the middle of the month.

Dr. McIlmoyle obtained consent for a *post-mortem* examination, and performed an autopsy under considerable difficulties. The brain was forwarded in a fresh state to Dr. Anderson, who placed it in a hardening solution to prepare it for sectioning.

On superficial examination of the brain in the fresh state, the whole anterior part of the right cerebral hemisphere could be seen to be distinctly larger than the left. Over the enlarged portion the convolutions were somewhat flattened. On palpation over the right frontal and Rolandic areas there was a sense of loss of resistance as compared with the same areas on the opposite side. When hardened the brain was sectioned, and disclosed a tumour with ill-defined margins in the frontal lobe of the right cerebral hemisphere. The extent of the tumour in various directions was as follows: Inferiorly it reached almost to the caput of the caudate nucleus. It was, however, slightly in front of this, and immediately over the roof of the anterior horn of the lateral ventricle; in this locality it most nearly reached the internal capsule, being not more than 1 cm. away from the anterior fibres (Fig. 2). From this lowest point the tumour could be traced in continuity upwards to the surface of the hemisphere at the anterior end of the superior frontal sulcus. On the brain surface it occupied an area of 1·5 cm. in width by 2·5 cm. in length, and equally implicated the gyrus frontalis superior and gyrus frontalis medius (Fig. 1). Be-

tween this cortical involvement and the lower limit of the tumour, near the head of the caudate nucleus, there was a broadening in all directions, so that 1 cm. beneath the frontal cortex it extended backwards considerably, and nearly reached the motor fibres of the corona radiata (Fig. 1). About midway between the upper

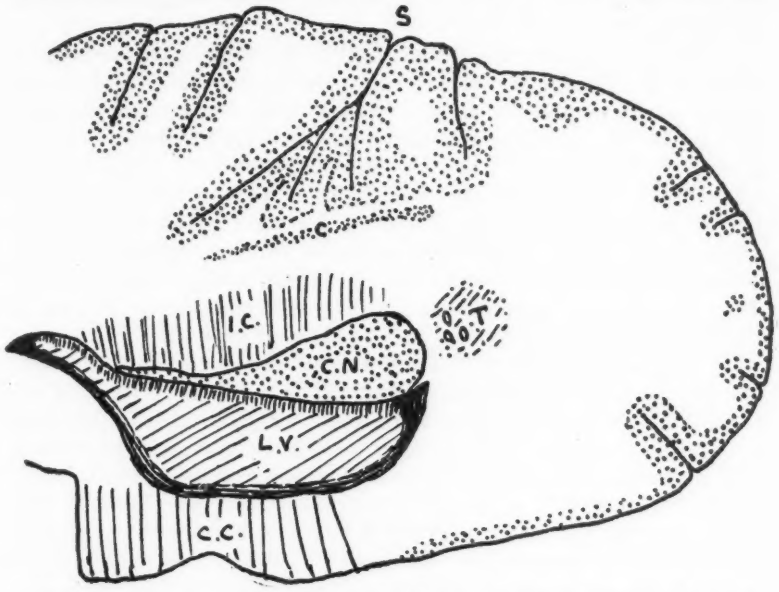

FIG. 2.—*Diagram made from a tracing of a horizontal section, a considerable distance below that represented in Fig.* 1.

The upper border is on the outer surface of the right cerebral hemisphere, while the lower border is on the mesial surface. T. is the tumour, which is bounded by indefinite borders, and contains a few gelatinous masses. C. is the claustrum. I.C. is the internal capsule. C.N. is the caudate nucleus. L.V. is the lateral ventricle, and C.C. is the corpus callosum. S. is the fissure of Sylvius. Both diagrams are looking from below upwards.

and lower limits of the growth the greatest antero-posterior and lateral diameters were found, and measured about 6·3 cm. in a transverse direction by 3·5 cm. in an antero-posterior direction (Fig. 1). On the mesial surface of the gyrus frontalis superior the tumour again appeared superficially, occupying an area of 1 cm. by 1 cm. (Fig. 1). It might be noted that the growth was not discerned on the cortical surface until the brain had been cut into, the pia mater removed, and the tumour traced from the cut surfaces.

XUM

The cut surface of the tumour presented several hæmorrhagic areas, and also several small sized areas of gelatinous transformation—the "*gallertiger Umwandlung*" of Kaufmann. These areas of gelatinous transformation were very firm in consistence after the brain had been hardened. The edges of the tumour shaded off very gradually into the surrounding tissue, suggesting an infiltrating glioma.

The gross appearance of an infiltrating glioma was confirmed when a microscopical examination was made. The microscopic sections showed a richly cellular glioma, with areas of hæmorrhage and areas of degeneration, which stained very poorly. Several giant cells were found. Some of the polymorphous nuclei of these were round and some more oval. They demonstrated well the properties which have given rise to the term gliosarcoma. This term, however, is a misnomer, since a sarcoma arises from the mesoblastic tissue, while a glioma originates from the epiblast. The similarity of these gliomata to the sarcomata consists only in their richly cellular property and their rapid growth.

Some of the points which determined the diagnosis in the case just quoted will now be recapitulated. The headache, optic neuritis, vomiting and dizziness considered together pointed to an organic intracerebral disease. The length of time over which the history extended, and the normal course of the temperature, ruled out any acute condition, such as acute meningitis or cerebral abscess. The holding of the left arm in a flexed position in many of the seizures, the smoothness of the left naso-labial fold, the movement of the uvula to the right on phonation, the protrusion of the tongue to the left, and the diminution of the left abdominal and epigastric reflexes, suggested the motor area of the right cerebral hemisphere as the seat of the lesion. It will be recalled here that Dieulafoy holds that disease of the frontal area alone may account for Jacksonian seizures. The absence of the extensor type of plantar reflex was against the propostion that the motor area could be involved to any considerable extent. The early mental enfeeblement, the age of the patient, and the lack of definite localizing symptoms, pointed to the right frontal lobe as the site chiefly involved. The negative Wassermann reaction would apparently rule out any syphilitic affection, but the marvellous improvement under treatment by potassium iodide and the admission of previous venereal disease caused all in charge of the case to hesitate in diagnosing a non-syphilitic tumour. Indeed, the concensus of opinion was that a right frontal gumma was likely to be the condition present.

A voracious appetite is said to be common in tumours in the neighbourhood of the uncinate gyrus. In this case the voracious appetite was a terminal symptom, and evidently had no localizing value. With the exception of the staggering gait cerebellar symptoms, such as noted by Bruns, Wilson, and others, were absent.

Ferrier, writing in Allbutt's "System of Medicine" summarizes his article very well in the following paragraphs:

1. Lesions of the frontal lobe may be said to be not infrequently latent.

2. On the other hand, in some cases, especially if the lesion is bilateral, and even in the case of lesions which are not calculated to cause pressure or disturbance of the brain in general, there may be mental symptoms, of which the chief characteristics are failure of memory, hebetude, apathetic indifference, tendency to sleep, vague restlessness, inability to concentrate attention, and silly jocularity.

3. Regional diagnosis of a lesion of a frontal lobe is rendered more probable if, in addition to the psychical symptoms, there occur convulsive or paralytic symptoms, monoplegic or hemiplegic, on the opposite side of the body. These symptoms are indicative of extension of the disease backward into the Rolandic area.

4. The diagnosis of lesions of the frontal lobe may be made still more certain if, in addition to the symptoms enumerated under 2 and 3 above, there are signs of pressure in the anterior fossa, with perhaps unilateral loss of vision, anosmia, or paralysis of one or other of the oculomotor nerves.

5. The diagnosis is confirmed if, in addition to some or a combination of several of the above mentioned symptoms, there is pain on deep pressure on the frontal bone. This pain may be entirely absent if the lesion is subcortical, and is especially to be found in cases of tumours causing tension or irritation of the dura.

Before concluding we desire to express our thanks to Dr H. B. Anderson for his kindness in giving valuable suggestions and allowing us to publish the above notes of the case, which was under his care while in St. Michael's Hospital. On behalf of Dr. Anderson we also wish to thank Dr. McIlmoyle, who was so keen in his interst and study of the case as to perform an autopsy under most inopportune circumstances.

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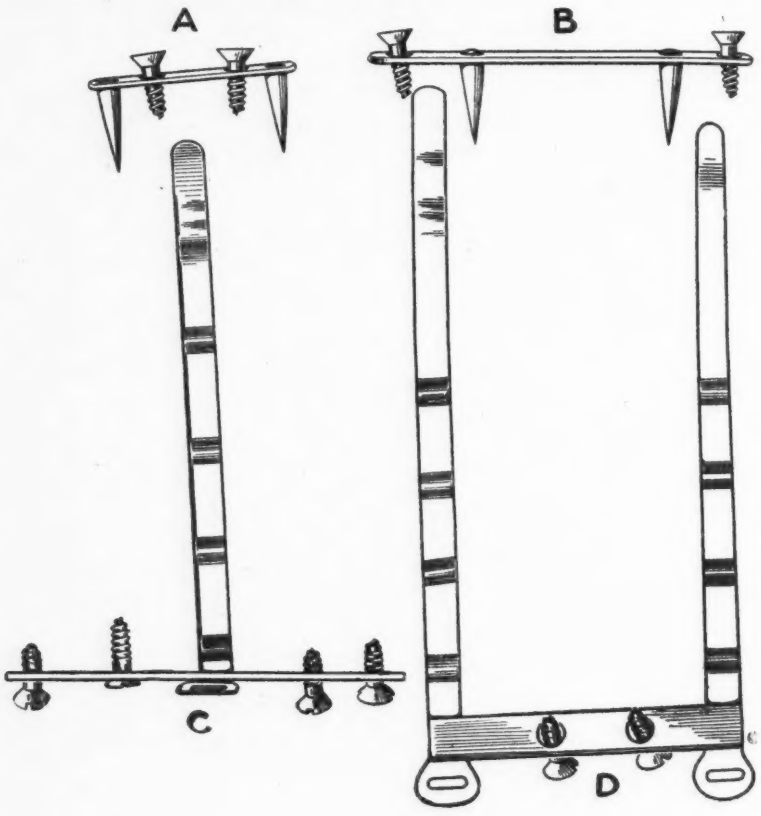
XUM

A BONE STAPLE-PLATE

By J. K. McGregor, M.D.

Hamilton, Ontario

THE chief difficulty in using the ordinary bone plate in the treatment of fractures by the open method is to keep the fragments in position while the screws are being inserted. This increases the manipulations, lowers the vitality of the parts and renders them more liable to infection.



Some workers have found a bone staple easier to use, but have met with two objections, namely, the spike is too large and tends to split the bone, and too long allowing it to penetrate almost any bone except the femur. For two years a combined staple-plate, as described, has been employed with very satisfactory results, by myself and a few friends.

Figs. A and B show the ordinary plate with spikes in the middle or at the ends. The spikes are half inch in length, round, thin, and very sharp, so that they may be started into the bone with the pressure of the thumb. As soon as the spikes enter the bones any distance the fragments do not move and the reinforcing screws can easily be inserted.

Figs. C and D show how a German silver band may be attached to a plate or staple-plate; this proves very useful in oblique fractures of the long bones. The band is raised at intervals so that it does not completely surround the periosteum.

CURE OF LEPERS. Three inmates of the leper station at Peel Island have been released. These are aboriginal half-castes and a South Sea Islander. The Queensland natives came from York Peninsula and Gayndah district respectively. The Acting Commissioner for Public Health states that the men had been in the institution five or six years, and it was indicated in reports that they had shown lepra bacilli on their admission. During the eighteen months he had visited Peel Island, however, he found that these three men had not shown any signs of the disease. They will be released under surveillance, and must report themselves every three months. Two white men were discharged from the institution under similar conditions about six weeks ago.

—*Australasian Medical Gazette*, October 4th, 1913.

XUM

Editorial

AN IMPORTANT EXPERIMENT

THESE are days of rapid advances in medical education, and it is safe to say that no institution during the past twenty years has had more influence in initiating reforms which are now common features of most curricula than the Johns Hopkins school and hospital. In practically all the more considerable schools at the present day the heads of departments in the preliminary subjects, anatomy, physiology, pathology, etc., give their whole time to teaching and research. But the advisability, or even the feasibility, of making similar arrangements in the clinical branches has not been apparent. It was first suggested by Dr. L. F. Barker more than ten years ago, and when he was recalled from Chicago to Baltimore to fill the very large vacancy left by Dr. Osler, he urged that the professorship of medicine be put on the full-time basis. The proposal gave rise to a warm discussion, but it has been evident for some time that its realization was only a matter of providing the large endowment required.

The necessary funds are now forthcoming, the Genera Education Board having recently appropriated the munificent sum of $1,500,000 to the Johns Hopkins Medical School, "for the purpose of so reorganizing the departments of medicine, surgery and pediatrics that the professors and their staffs in these departments will completely withdraw from paid practice in order to devote their entire time to the care of patients, teaching and research in their respective departments." It is explained that this does not mean that these professors or those of their assistants who are on the full-time basis may not see and treat patients outside the hospital, but

any fees for such services are to go to the fund. Nor does it mean, of course, that all the teachers in these departments will come under this arrangement. The majority of the teaching staffs will still be composed of men engaged in private practice.

So radical are these changes that there cannot fail to be differences of opinion as to how the experiment will turn out. We believe, however, that there is no institution where it could be given a more favourable trial. The present heads of the departments affected are, besides Dr. Barker, Dr. W. S. Halsted, and Dr. John Howland. These men are all in sympathy with the change, but it has not yet been announced whether they will be in a position to continue to occupy their chairs under the new arrangement. The salaries to be paid have not been fixed, but will probably be less than half or one-third of their present incomes. If they feel they cannot retain their professorships, it is hoped that the school may still have the benefit of their services. The scientific spirit for which it has always been famous, makes such a thing possible.

And this calls attention to one manifest disadvantage of the scheme, namely, the difficulty which must be experienced, at any rate now in the transition period, in filling such positions as those proposed with men of established reputation. But even so the gains may well outweigh the loss which this and other disadvantages entail. Both students and hospital patients will benefit in many ways, and by providing the workers with adequate salaries, the facilities for clinical research are increased enormously.

The General Education Board was established in 1902 to distribute the proceeds of a fund—now some fifty millions—placed in its hands by Mr. Rockefeller in aid of higher education. The present gift is by far the largest the board has ever made to one institution. It is very fitting that the fund is to be called the Welch Endowment for Clinical Education and Research in recognition of the great services rendered by Pro-

XUM

fessor Welch to medical education in America. The working out of the experiment will be watched with keen interest.

INDIANS AND TUBERCULOSIS

THERE is a wide-spread belief that the semi-civilized American Indian of to-day is a degenerate compared with the "noble savage" who roamed the pages of our juvenile fiction, if not the forests of our country in the days of the pioneers. And it is customary to consider the vices and diseases of the red man to be the result of contact with the whites. We have, it is true, taught him the abuse of fire-water, and deprived him, if deprivation it be, of the discipline of war. Alcohol, like a sinister shadow, has always dogged the march of civilization. Yet, in the light of history who but the cynic or fanatic will maintain that a sober barbarism is preferable to a moderately alcoholic civilization?

The chief enemy of the Indian to-day is tuberculosis, and this, too, has been laid to the charge of the conquering race; for the existence of the disease on this continent in pre-Columbian days has often been doubted. The evidence of the early New England physicians, however, is against this view; and certainly it is difficult to see how one can read far in the Jesuit Relations without becoming convinced that scrophula and phthisis were very prevalent amongst the aborigines in the early seventeenth century, perhaps quite as prevalent as to-day. Moreover, the hygiene—not to mention the morals—of the wigwam, especially in the winter quarters, was certainly not better than that of the modern reserve. Doubtless tuberculosis is the principal factor preventing any great increase in the Indian population, and yet it would seem that the aborigines are probably more numerous now than ever before. Indeed, with a vast country and an abundant food supply, even making generous allowances for the sacrifice of life in continual warfare, it is difficult to account for the astonishing sparseness of the population of the continent

three hundred years ago without conceding the prevalence and destructiveness of infectious diseases.

These matters are brought to our attention by Dr. D. A. Volume, of Erskine, Alberta, who writes that having recently had the opportunity of examining about three hundred on the reserves between Winnipeg and Port Arthur, he "did not find a single Indian in whom the physical signs of some form of tuberculosis were not present." For this racial susceptibility he offers an explanation. Indians, he says, have a thin skin of peculiarly fine texture, as evidenced by their complexions in youth and the multitude of minute wrinkles which the skin displays in age. Inferentially the mucous membranes are correspondingly thin, the armour as it were is weak, and the lining of the respiratory tract, for instance, allows the germs to gain an easy entrance into the system. Similarly, assuming that the Irish, as a race, are thin-skinned and the Jews thick-skinned, the terms being used in their literal sense, he would account for the susceptibility of the former to tuberculosis and the relative immunity of the latter. The case of the negro is not touched upon. The theory is also held to apply as a rule to individuals, those with delicate skin, thin nails and silky hair being relatively more prone to the disease.

The hypothesis is interesting, and if the premises be sound, the thinness of the skin and mucous membrane might well be an *index* of susceptibility; but the principles of immunity, the study of which has yielded such a rich harvest to humanity in recent years, are anything but simple, and our limited knowledge of them would certainly lead us to suppose that the causes of racial resistance to an infectious disease lie more than skin-deep.

THE AMERICAN COLLEGE OF SURGEONS

THE first formal convocation of the American College of Surgeons was held on the thirteenth of last month, and the time seems opportune for some comment on the aims of

XUM

the institution. The advances in surgery during the past few years have come with such rapidity that a good deal of readjustment is necessary. We have on the one hand brilliant achievement: on the other mediocre work far below a reasonable average. Some standardization of surgery is needed and in this need the American College of Surgeons has found its particular task—to promote "some understanding of the responsibilities of surgical work, some recognition of the differences between surgical work and medical practice, some definition of the special training and experience that a doctor should have before he undertakes the responsibilities of the graver operations of modern surgery." In order to establish a standard, the intention is "to recognize those men now in practice whose training, experience, and character entitle them to be considered specialists in surgery or in the strictly surgical specialities, . . . the choice to be based on individual fitness alone." It is proposed, when the College has been in existence for one year, to admit to membership by examination only.

Some criticism has been made, first, because the college is a "guild," and secondly, because men who are not specialists, but who are doing good work in surgery, are excluded. In a sense, the first objection is true, but the "guild" is open to all who show fitness; as regards the second cause for criticism, this is an age of specialization, and the men who are best fitted to assist the college in its chosen work are those whose whole effort is directed towards the elevation of the standard of surgery.

The college has taken up the evil known as "fee-splitting," to which reference has already been made in this *Journal*, and thus expresses itself: "The college will not knowingly select for, or retain within, its ranks any one who practises fee-splitting, directly or by subterfuge."

THE ST. JOHN MEETING

AS has been previously announced, the date of the next annual meeting of the Association which is to take place in St. John, N.B., has been fixed for the four days, July 7th to 10th, inclusive. The necessary preparations for ensuring the success of a large medical meeting make heavy demands on the time and energy of the local physicians. But the profession in St. John has been well organized for the purpose under the able leadership of the president-elect, Dr. Murray Maclaren, and the local secretary, Dr. J. S. Bentley, and the various committees have taken up their tasks with enthusiasm. Work has begun on the arranging of the programme, and it is requested that those members who may desire to contribute papers communicate as soon as possible either with Dr. Bentley, or with the general secretary.

PROBABLY no medical man in the country has been more faithful than Sir James Grant in attending meetings, a good habit which with advancing years he shows no sign of relaxing. Indeed he seems to wear his years lightly. Like the optimism of ben Ezra, the utterances of a vigorous and enthusiastic old man are always inspiring. In an address which Sir James gave as president of the Canadian section of the recent International Congress on School Hygiene at Buffalo, he took as his subject School Hygiene and Child-life. In it the octogenarian shows keen appreciation of the needs of the child and its education. He pleaded amongst other things for the country life and the improvement of country schools, and for instruction to mothers on diet, not only for babies, but for older children, statistics gathered in the great American cities having shown a sadly large proportion of the school children to be chronically underfed. He showed that the educational system of the present day was becoming more cumbersome and complicated, and a serious test of strength

XUM

to young brains. The mental and physical wellbeing should advance equally. Each brain, like each blade of grass, was single in character and power, and its merits were to be studied. Difficult as this might be, the outcome would subserve the best interests of a progressive age. There was need of teachers or inspectors trained in psychology to detect the mentally deficient. For stimulating the faculty of observation, a little practical encouragement to collect such things as specimens of the common insects should be begun early. Finally let the children's feet be guided, and thereby ultimately the arms of the nations, into the way of peace.

At a recent meeting of the Medical Council and the University of Alberta, an agreement was reached whereby the Medical Act was amended so as to give the University of Alberta the power to specify the subjects for examination as well as the right to conduct the examinations. It was agreed also that any person in possession of a diploma from an approved medical college and therefore entitled to write an examination, should be given an interim license to practise anywhere in the province at a distance of not less than twenty miles from the office of a licensed physician; in case of failure, the applicant to be afforded another opportunity to pass the examination and the interim license to be renewed. The purpose of the amendment is to remove the barriers existing in the way of physicians going to Alberta from other provinces and at the same time to safeguard the public interest. The University is offering this session the first year of a course in medicine. It is the intention, ultimately, to give a five year course of study, based on the findings of the committee of "the Hundred Leading Educators of the United States and Canada," but for the present the first three years' work only will be given. A committee, consisting of the president, the scientific members of the teaching staff, and the university examining board, has been organized for the purpose of mak-

ing the necessary arrangements. This year the work will be confined to the pure sciences, chemistry, biology, physics, with one modern language, and with the addition of bacteriology the work of this latter department being in charge of Dr. Revell. During the winter two professors in medicine will be appointed, one to the chair of anatomy, the other to that of physiology. Additional appointments will be made to meet the requirements of the second year from among the local medical men; and the following year two other full-time appointments will be made. The laboratories for the second year work will be set up and equipped during the year. The legislature, at its recent session, passed an act giving the university the right to call upon all public institutions for anatomical material, so that abundance of material from the point of view of anatomy will be available. A building will be erected next summer to serve as a temporary accommodation for this department.

In entering upon the department of medical instruction, the University of Alberta to a large extent has been actuated by a desire to improve conditions now existent in the rural districts of the province. At present there are wide tracts, sparsely populated, where it is extremely difficult to obtain medical assistance. It is hoped that the great need for practitioners in these districts will be met when men, familiar with the need, are trained in the profession of medicine under their own conditions. The university is to be congratulated upon its entrance into a new field of activity, and we wish it every success in the accomplishment of its purpose.

In a recent editorial we advocated short periods of residence in a sanatorium as the ideal method of giving students a much needed practical knowledge of early tuberculosis. Consequently we are gratified to learn that the scheme is to be put in operation at Ninette, for the benefit of the students of the Manitoba Medical College—and of the sanatorium, which with a recent addition, the gift of the Daughters of the

XUM

Empire as a memorial to King Edward, has accommodation for one hundred and fifteen patients. The plan was suggested by Dr. Bell of the Provincial Board of Health, and has received the hearty support of the superintendent, Dr. A. Stewart, and an enlightened board of trustees.

Dr. Thornton, vice-president of the Dominion Medical Council, writes that "the Manitoba Medical Council at its regular meeting at Winnipeg on October 8th, dealt with Dominion Registration. It was unanimously agreed to accept for registration in the province all applicants who presented a certificate of registration on the Dominion Medical Register, whether the same had been obtained by examination or by virtue of ten years' previous provincial registration, subject only to proof of identity and payment of the provincial registration fee of one hundred dollars. The Registrar was also authorized to issue to applicants the certificates necessary to enable them to register on the Dominion Register. The fee for a certificate of ten years' provincial standing was placed at five dollars. The fee for a certificate of holding a medical degree accepted by this council to enable the applicant to take the Dominion examinations was placed at twenty-five dollars, but in the event of such applicant being registered in the province, twenty dollars of this would be credited on the registration fee." In addition to that of Manitoba, the councils of Ontario, New Brunswick and Nova Scotia have accepted Dominion Registration in its entirety.

Dr. Ernest Glynn, of the University of Liverpool, in an inaugural lecture on the study of disease in domesticated animals, recently made an earnest plea for the establishment of a hospital for animals in connexion with the veterinary school at Liverpool. Enumerating the diseases which are common to man and to the domestic animals, he shewed how frequently the one is the outcome of the other, and how researches in animal diseases might lead to knowledge of human ailments.

In connexion with International Labour Treaties, an official conference of government representatives was held at Berne during the last week of September. Resolutions were adopted on this occasion to prohibit the night work of boys under sixteen years of age and to determine the maximum duration of a working day for women and young persons under sixteen. The night work of women and the use of white phosphorus in match manufacture have been prohibited already in many of the large industrial centres of the world.

In reference to the epidemic of smallpox in Sydney, New South Wales, the *Australasian Medical Gazette* contains an editorial which deals with the attitude of the government towards vaccination. When the epidemic broke out—and since then over seven hundred cases of the disease have been reported—a deputation "representative of the profession and the commercial interests of the city, waited upon the Premier to point out that the experience of all countries has been to show that vaccination, and vaccination alone, was effective as a preventive of smallpox." Against a compulsory vaccination bill was heard the cry of the anti-vaccinationist, aided by the labour supporters of the government, and the result has been the introduction of a bill which provides for infantile vaccination, revaccination at the age of ten and again at the age of twenty-one years, but with a "consciencious objection" clause which completely nullifies the measure, for any one who so desires can thus avoid vaccination. In view of the facts, resolutions were passed at the annual meeting of the New South Wales Branch of the British Medical Association and at a meeting of the Federal Committee in Sydney last July, to the effect that in the opinion of those bodies, the medical profession should be consulted by the government before legislation was introduced which required the coöperation of the medical profession to make it effective.

XUM

Book Reviews

A Manual of Otology. By Gorham Bacon, A.M., M.D. New (6th) edition, thoroughly revised. 12mo, 536 pages, with 164 engravings and 12 plates. Cloth, $2.25, net Lea & Febiger, Philadelphia and New York, 1913.

The frequency with which new editions of this manual are called for indicates a widespread popularity among practitioners and specialists, and shows that it fills admirably the important function of a students' text-book. An examination of this new edition shows that it reflects the subject in its latest aspect. Many sections have been wholly rewritten and enlarged. Emphasis has been laid on the most modern methods of diagnosis and treatment. The excellent series of illustrations has been increased by many new ones, which have been inserted wherever they could be of value in helping to an understanding of the problems under discussion.

A Laboratory Manual of Invertebrate Zoology. By Gilman A. Drew, Ph.D. Second edition. 12mo of 213 pages. Price, $1.25 net. Philadelphia and London: W. B. Saunders Company, 1913. Canadian agents: The J. F. Hartz Company, Toronto.

This book is an expression of the practice which prevails at the Marine Biological Laboratory at Nood's Hole, and is issued with the aid of the former and present members of the staff of that important station. It has arisen out of the laboratory directions for students, and the matter is arranged in natural sequence. The note of the book is a continual reference to the forms of adaptation which fit the different animals for their particular lines. The book will have a wide interest even outside of the laboratory. Much of it may be read, and understood, by any intelligent person who has chance access to material along the sea-shore. As a companion on a summer holiday it would be admirable.

Books Received

THE following books have been received and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

A PRACTICAL TREATISE ON MEDICAL DIAGNOSIS. FOT STUDENTS AND PHYSICIANS. By JOHN H. MUSSER, M.D., LL.D. Sixth edition, revised by J. H. MUSSER, JR., B.S., M.D. Illustrated. Price, cloth, $5.00 net. Philadelphia and New York: Lea & Febiger, 1913.

INTERNATIONAL CLINICS. Edited by HENRY W. CATTELL, A.M., M.D., and others. Volume III. Twenty-third series, 1913. Philadelphia, London, and Montreal: J. B. Lippincott Company.

PATHOLOGY, GENERAL AND SPECIAL. A MANUAL FOR STUDENTS AND PRACTITIONERS. By JOHN STENHOUSE, M.A., B.Sc. (Edin.), M.B. (Tor.). Second edition, revised and enlarged; including selected list of State Board Examination Questions. Price, cloth, $1.00 net. Philadelphia and New York: Lea & Febiger, 1913.

ESSENTIALS OF PRESCRIPTION WRITING. By CARY EGGLESTON, M.D. Price, cloth, $1.00 net. Philadelphia and London: W. B. Saunders Company, 1913. Canadian agents: J. F. Hartz Company, Limited, Toronto.

HYGIENE AND PUBLIC HEALTH. By LOUIS C. PARKES, M.D., D.P.H., and HENRY R. KENWOOD, M.B., F.R.S. (Edin.), D.P.H. (Lond.). Fifth edition; illustrated. Price, 12s. 6d. net. London: H. K. Lewis, 1913.

THE IDEALS AND ORGANIZATION OF A MEDICAL SOCIETY. By JAMIESON B. HURRY, M.A., M.D. Price, 2s. net. London: J. & A. Churchill, 1913.

XUM

MATERIA MEDICA, PHARMACOLOGY, THERAPEUTICS AND PRESCRIPTION WRITING. FOR STUDENTS AND PRACTITIONERS. BY WALTER A. BASTEDO, Ph.G., M.D. Octavo of 602 pages, illustrated. Price, cloth, $3.50 net. Philadelphia and London: W. B. Saunders Company, 1913. Canadian agents: J. F. Hartz Company, Limited. Toronto.

DORLAND'S AMERICAN ILLUSTRATED MEDICAL DICTIONARY. Seventh revised edition. Edited by W. A. NEWMAN DORLAND, M.D. Price, flexible leather, $4.50 net; thumb indexed, $5.00 net. Philadelphia and London: W. B. Saunders Company, Limited, Toronto.

A TEXT-BOOK ON GONORRHEA AND ITS COMPLICATIONS. BY GEORGES LUYS, Paris. Translated and edited by ARTHUR FOERSTER, M.R.C.S., L.R.C.P. (Lond.). Illustrated. Price, $4.50. London: Baillière, Tindall & Cox, 1913. Toronto: The Macmillan Company of Canada, Limited.

THE HEALTHY MARRIAGE. A HEALTHY AND PSYCHOLOGICAL GUIDE FOR WIVES. By G. T. WRENCH, M.D., B.S. Price, $1.00. Toronto: The Macmillan Company of Canada Limited, 1913.

THE annual meeting of the Ottawa Anti-tuberculosis Association was held on Tuesday, October 21st. Dr. J. A. Machado, who was reëlected president of the association, stated that during the year there had been one hundred and twenty-three new cases of tuberculosis, bringing the total number up to three hundred and forty-four. Fifty-seven of these had died. The May Court Dispensary staff had examined during the year one hundred and thirty-seven patients, forty-five of whom were non-tubercular. The Perley Memorial Hospital for incipient cases, with its forty beds, had proved of great assistance. The association now feels great need of an administration building. The officers elected for 1913-1914 are: honorary president, Mr. J. Manuel; vice-presidents, Archbishop Hamilton, Dr. G. S. MacCarthy, Sir L. H. Davies, Hon. E. H. Bronson, the Mayor of Ottawa; recording secretary, Mr. W. Tucker; corresponding secretary, Rev. Dr. Moore; treasurer, Mr. G. B. Irvine; and solicitor, Mr. J. E. Orde, K.C.

Res Judicatæ

THE PRESENT STATUS OF SURGERY IN PULMONARY TUBERCULOSIS

THERE have appeared within the last three or four years several articles from the pen of surgeons dealing with the technique and the results of operations designed to benefit certain cases of pulmonary tuberculosis; and the whole subject of surgical relief in this disease has taken on a new phase. While the tendency in the earlier attempts of surgery was to attack the lung substance itself, chiefly in the way of draining cavities or resecting portions of tuberculous lung, the newer work, based largely upon the results of artificial pneumothorax and calculated to imitate the effects of pneumothorax, has concerned itself chiefly with the attempt to produce lung collapse by the resection of ribs. The lung itself is not to be touched; all work must be extra-pulmonary. While Quincke, and Spengler, and Turban, twenty years ago and more, carried out the resection of ribs over tuberculous cavities in the idea of producing a local collapse of the lung, it remained for Brauer to lay down the principle that any limited resection of a few of the ribs was quite insufficient, and that in order to obtain results it was necessary to resect a large number of ribs and a considerable portion of each one of them. Only thus could one get the effect of atmospheric pressure with that proper collapse of the lung which the results of artificial pneumothorax had shown to be necessary. Friedrich elaborated and systematized the operation proposed by Brauer, and established the principle that the greater the removal of ribs the greater, other things being equal, was the benefit derived from the operation. He published last year the results of twenty-eight cases operated on by his method. Although eight of his patients died from the operation, a large proportion of the remainder were greatly benefited by it, and he points out that all his patients were in a more or less hopeless condition before operation. Friedrich's operation consisted in an almost entire removal of the ribs of the affected side from the tenth up to the second and sometimes even including the first. The objection was immediately raised, with justice, that his operative mortality was prohibitive. As a matter of

fact, even when the operation was done in two stages, as Sauerbruch later recommended, its immediate danger was very considerable. We shall refer later to the nature of this danger. During the last two years, however, there have been published by Wilms and by Sauerbruch methods of operation which in their hands have given a very low operative mortality. Sauerbruch in particular has published a long general review of the question, and gives in detail the history of forty three cases of his own. The writer had occasion during the last summer to talk the subject over with him. The number of his cases meanwhile had risen to somewhat over eighty. It is the chief purpose of this review to give a résumé of this work of Sauerbruch's.

One may begin with the proposition that the climatological and dietetic treatment of pulmonary tuberculosis has but slight beneficial influence upon the more advanced cases, particularly those with ulcerative processes, and with cavities. In this fact, which is generally admitted to be true, lies the justification, at least to a certain extent, for operative interference, if it can be demonstrated that operation can improve the patient. The bulk of the work hitherto done is of German origin, and, as one would expect, the scientific basis of the operations proposed has been properly worked out. It is worth while reviewing briefly this aspect of the subject.

The work upon artificial pneumothorax in the treatment of lung tuberculosis, that is upon its effects in the healing of diseased lungs, may be taken as of equal value in explaining the curative effect of extensive rib resection. In both cases the object to be attained is collapse of the affected lung; in the one case by the injection of nitrogen gas, in the other, by allowing the atmospheric pressure to compress the lung through the soft parts of the chest wall after the bony thorax has been removed. In Brauer's view artificial pneumothorax and chest wall resection are merely two different ways to the same goal. Artificial pneumothorax is the operation of choice. But where it is impossible to carry this out on account of adhesions, the removal of the ribs comes to be considered. For the sake of brevity this removal of ribs may be referred to in what follows as *thoracoplastic*, the name which by common consent is now given to the operation in Germany.

What is the effect upon the lung which has been collapsed by either of these methods? First of all the lung is of course greatly reduced in volume; this is the purely mechanical effect of compression, and the practical result is that cavities are made smaller, or

are obliterated. Secondly, the lung is put at rest, it is excluded from its proper function; as a result the blood circulation suffers; aeration is imperfect; the blood remains venous; and the end result, as has been shown by much experimental work, is the development of fibrosis. The lymph circulation likewise suffers stagnation inasmuch as the respiratory movement represents the chief factor in promoting the lymph flow, as was shown by Tendeloo: the practical result of this is a lessened absorption of toxins. Experimental work has also shown that to deprive the lung of its function, to make it air-empty, as for instance by ligating the main bronchus, results in fibrosis. The ligation of the pulmonary artery or veins, the cutting of the phrenic nerve with its consequent paralysis of the diaphragm, the ligating of the main bronchus, all these with their common factor of excluding the lung from its specific work, and the alteration in its circulation, result in the development of fibrosis. Now fibrosis is the prime factor in the cure of tuberculosis. Thus the collapse of the lung artificially produced, may be expected to tend towards the cure of tuberculosis both by inducing fibrosis and by the purely mechanical effect of compression of cavities.

Of course it is clear that to obtain a complete collapse of the lung by means of resection of ribs, pretty well all of the ribs on one side must be removed. If the operation in this respect is partial, the beneficial effects are apt to be partial. But it soon became evident through Friedrich's work that a complete thoracoplastic was a dangerous operation. We know from the pathology of open pneumothorax that the mediastinum by reason of the lack of the cohesion force which normally exists between the lung surface and the chest wall, together with the effects of atmospheric pressure, is shoved to the opposite side during inspiration, and hinders the sound lung in its inspiratory unfolding; during expiration on the other hand, it yields to the one-sided pressure of the expiratory forces and returns towards its own side; the result is that there develops what the Germans call "mediastinal fluttering." This paradoxical to and fro movement of the mediastinum leads to considerable diminution of the work of the other lung, the result of which is dyspnœa, which may become quite serious; indeed, through its secondary effect on a weak heart, combined with its direct effect upon the respiratory exchange, it may cause death within a short time. Clinically in such cases there arises after operation a characteristic picture. On the operated side one sees the chest wall drawn in strongly during inspiration, and pushed out during expiration. This so-called "paradox" is the result of the "mediastinal flutter-

XUM

ing," and the effect upon the respiratory function, and upon the heart, is the same as with an open pneumothorax. After the patient has got over the shock of the extensive operation, there appears a modified cyanosis which gradually increases; breathing becomes superficial and very rapid, and the reversed respiratory movements of the operated side can be seen even through the bandages; expectoration is very difficult; the pulse is small and frequently running. In unfavorable cases the dyspnœa increases to such an extent that respiration becomes panting; ultimately after great distress the patient dies from the interference with respiration, with in many cases, a simultaneous heart failure. On the other hand, when the patient overcomes this serious condition, the ultimate clinical results resemble in their good effects the best results of artificial pneumothorax. One sees the same diminution or disappearance of sputum, the same fall of temperature, the same improvement of the general condition.

It became clear that the total removal of ribs on one side, that is the complete thoracoplastic, was too dangerous an operation, (and even Friedrich, its protagonist, is beginning to give it up), so that various modifications safer for the patient have been advised. Wilms two years ago proposed what now goes under the name of "columnar resection." The operation, briefly, consists in the removal of three or four centimetres of each rib from the second or third to the eighth or ninth, in the paravertebral line, and, if necessary, of a second removal some time later, of one or two centimetres of the ribs in front besides the sternum from the second to the fifth or sixth. Sauerbruch in the majority of his cases now does a somewhat more extensive operation than this of Wilms', but much less extensive than the old complete thoracoplastic. In one, or in sometimes two sittings, he resects from the first or second to the tenth ribs posteriorly taking away about ten centimetres from the lower ribs, and four or five centimetres from the upper ones, the resected piece gradually becoming shorter as one goes up. In very bad cases where he desires complete retraction and complete functional rest of the lung, he still carries out the complete thoracoplastic, but does it only in three or four sittings. In this way he claims that the mortality is reduced to some five or six per cent. The general principle underlying the various modifications in extent of rib resection is that the less rib one takes away, the less perfect is the retraction of the lung and its functional rest; therefore, in extensive disease of the lung, Wilms' operation is apt to be of slight value. He draws particular attention to the danger

of doing a partial rib resection over cavities in the upper lobe on account of the danger from the interference with expectoration which may allow an aspiration of the secretion of the cavity into the lower lobe; in such cases he says one should always begin with rib resection over the lower lobe, even if the latter is comparatively healthy. The technique of Sauerbruch's operation is thus described. The skin incision runs from the level of the second rib vertically downwards, in the paravertebral line, and bends forward along the tenth rib. The muscles are cut through in the direction of the incision so that the scapula at its posterior border is freed, and can be bent forward upon its anterior edge. It is astonishing how far the scapula can be lifted up and pulled forwards. The ribs are now resected from below upwards, beginning with the tenth or eleventh, to the extent of ten centimeters below, and four or five centimeters above. The decision as to how many ribs are to be removed in the first sitting depends upon the condition of the patient during operation. In the majority of cases one can confidently remove from the tenth to the second or first in one sitting without asking too much of the patient. In other cases when the condition is not good, one should confine one's self to the removal of four or five ribs. The removal of the first rib, in Sauerbruch's opinion, depends upon the palpation of the apex during operation. If after the resection of the second rib he is able to press the apex downwards with ease, it is not necessary to remove the first; if he finds the apex resistant, it is better to resect the first.

The question of the indications for operation is perhaps the most important, and as yet perhaps the least certain part of the whole question. The extra work put upon the sound lung is apt to lead to a certain degree of emphysema. But apart from that there is the danger of lighting up an already active or even quiescent focus of disease in the other lung. This has been observed a number of times after operation as after artificial pneumothorax. Still, a certain amount of disease, if quiet and of old date, does not contra-indicate the operation. In the diseased lung the conditions demanding operation are the same as those which make artificial pneumothorax justifiable. In general it may be said that the greater the tendency to ulceration and to cavity formation, the clearer is the indication for operation. Patients with long-standing disease which is progressive, which has been uninfluenced by climatic treatment, which has led to cavities, which is accompanied by fever and considerable expectoration, and in whom the other side is comparatively healthy, have been found to be the best subjects for the operation.

XUM

With regard to the clinical results, as has already been said, the most marked concern the diminution of sputum, fall of fever, and the improvement in the general condition. The lessening of sputum is so marked and constant a symptom that important conclusions may be drawn from it as to the later course of the disease; particularly when the amount of expectoration has been large, its diminution is sometimes astonishing, and it is actually a criterion of the steady improvement. On the other hand, if after early reduction of the sputum, the amount increases again, one may conclude either for an aggravation of the process, or for insufficient effect of the operation. Amounts of two hundred, even of four hundred centimeters have been observed in numbers of cases to disappear entirely, although gradually. The character of the sputum also changes, usually from the lumpy purulent type to a mucous and foamy appearance. The number of the bacilli is reduced; quite often they disappear entirely. The fever also gradually falls in the favorable cases after a preliminary rise, and parallel with this goes an improvement in appetite, in the subjective sensation of well-being, and in sleep: weight frequently increases.

As to the results, Sauerbruch reports upon forty-three cases of which eight were completely cured. Naturally the definition of *cure* is only a clinical one, but he understands by the word "cure" a condition in which the patients are completely free of fever, have no sputum, and above all no tubercle bacilli, and have become able to work; more than this, at least one year must have passed after the operation. Eight of his patients fulfilled these conditions. In seven others he noted a very good result in the sense of marked improvement: in four of these indeed, he felt that he could expect a cure later. Thirteen patients were definitely improved by the operation, although not so markedly improved as those just mentioned; some of these had been operated on only shortly before his report, whilst in others a second operation was necessary; still in seven of these thirteen he felt, from the course of the disease after operation, that further improvement or even cure was to be expected. Three patients were uninfluenced by the operation. On the other hand, four patients were definitely made worse by increase of the tuberculous process on the other side. Three patients died as the result of the operation, of these, however, two were exceptionally serious, in that they were completed by pyopneumothorax. If these two exceptions (desperate cases) had been excluded from the operation, his mortality rate would have been only one in forty-three, which equals 2·14 per cent. As to the late mortality, there

died at various periods after the operation, six patients, either of tuberculosis or of secondary tuberculous pneumonia. The total mortality including these late cases would amount to 17·3 per cent. These results compare very favourably with those observed after artificial pneumothorax. Sauerbruch counts that already twenty per cent. of his patients are cured, and that a still larger number with the lapse of time will be cured: their present course justifies this expectation. Such results, considering the serious nature of the disease, and the failure of climatic treatment, he feels afford complete justification for the operation. He recognises that surgical treatment of lung tuberculosis is still in its beginnings. It is clear that with a disease such as pulmonary tuberculosis, with the variety of its clinical and pathological pictures, and its well-known difficulties in matters of diagnostis and prognostis, there is still much to be done in the way chiefly of establishing the proper indications for operation, and also in the way of working out the technical details. It has to be confessed in the light of experience that mistakes were made, particularly at the beginning of the operative treatment of the disease. In a certain number of cases Sauerbruch says he refuses operation where formerly he would have considered it justifiable.

Sauerbruch's article closes with the detailed report of the forty-three cases mentioned, together with a number of *x*-ray pictures. It represents up to date the most complete account of this new branch of surgery, and one can see that in the matters of careful preparation, honesty of relation, and superior knowledge, it represents a model of the surgical monograph.

E. A.

F. Sauerbruch and H. Elving, "Die extrapleurale Thorakoplastik. Ergebnisse der Inneren Medizin und Kinderheilkunde, Sonderabdruck aus Band X," 1913.
Sauerbruch, "Phrenicotomie, *Muench. Mediz. Woch.*, March 25th, 1913.
Wilms, "Thorakoplastik, *Muench. Mediz. Woch.*, March 4th, 1913.

It is hoped that the wing which is being added to St. Luke's Hospital at Ottawa will be completed about the end of December. It is the gift of Mr. J. R. Booth and contains two large operating rooms, nineteen private and two public wards.

XUM

German Literature

ABSTRACTS OF GERMAN LITERATURE

HARMFUL ACTION OF UROTROPINE. *Muenchener Medizinische Wochenschrift.*

"IN hexamethylentetramin (urotropine)," writes Dr. Wilhelm Cuntz of the Heidelberg Skin Clinic, "we have one of the best drugs for the treatment of bacterial inflammation and catarrh of the urinary passages. Naturally one meets with countless failures in the use of this drug, but one does not, as a rule, anticipate any unfavourable influence upon the local process. Nevertheless there are cases in which urotropine actually increases the existing symptoms. The unfavourable action can show itself when the remedy is prescribed in the usual manner, dissolved in water and taken after meals, with no overdosage, by irritation of the urinary tract, hæmaturia and albuminuria. This fact has not been altogether overlooked by those who have made a study of the literature of urotropine, but it has not been sufficiently commented upon. In certain cases the harmful action is difficult to recognize if there is already a morbid process at work, which in itself is prone to complications, and so it happens that the drug is given in even larger doses, to the patient's harm."

The author then quotes case reports of various patients whose symptoms had become very marked under urotropine, many cases showing quite severe hæmaturia and albuminuria, and who had improved at once on withdrawal of the drug. The usual dose was two tablets of half a gram each dissolved in water three times a day after meals.

FINGER JOINT REPLACED BY ONE OF THE TOE JOINTS. BY DR. GOEBELL, of Kiel. *Muenchener Medizinische Wochenschrift.*

A man thirty-seven years of age, a violin player, consulted the author about his left little finger, saying that he had suffered much pain in the second interphalangeal joint for about a year. The pain first came on after he had executed a very difficult violin ex-

ercise and for four months he had been unable to use the finger for playing, and feared he must give up his musical vocation. Apart from a mild, fleeting gonorrhea at fourteen years of age he had always been healthy. The left little finger, in the region of the second interphalangeal joint showed a distinct spindle-shaped swelling. The articular ends of the phalanges were much thickened. Active and passive movement were painful and restricted, and crepitus easily elicited. The *x*-ray showed the thickened ends of the phalanges. It was, in fact, a severe crippling inflammation of the joint, leading to destruction. The early attack of gonorrhea had nothing to do with the condition. After various forms of treatment had failed, the following operation was performed on June 6th, 1912: an incision was made over the extensor aspect of the affected joint reaching to the root of the nail. The extensor tendon was exposed and its attachment to the terminal phalanx divided; the joint was then exposed. The ends of the bones were found to be much thickened. They were sawed through in such a manner as to leave a concave surface at the ends of the remaining bones, and the joint was removed. The first interphalangeal joint of the second toe, left foot, was then exposed through two lateral incisions and the joint removed by sawing through the bones so as to leave a convex surface at the ends of the removed bones. A Gigli saw was used for this work. The excised joint with its capsule was then placed in the space prepared for it in the little finger, and, after the extensor tendon had been sutured into place, it fitted and kept its position so well that it was not found necessary to wire the bones. The incisions in toe and finger were then closed. The after treatment consisted in the application of iodine, local hot-air baths, and passive motion.

Result: On March 17th, 1913, active and passive movement were almost normal in extent, and accompanied by a slight rubbing sound, but with no pain. Patient could play the violin almost as well as before the joint was affected. He still continues the local hot-air applications at intervals.

Dr. Max Krabbel, of the Bonn Clinic, has published a work on the filling of bone cavities with free-transplanted fat. The method has been used successfully in cases of osteosarcoma, simple chronic and tuberculous osteomyelitis. The presence of fistulæ is a contraindication to the procedure. In cases of widespread necrosis of bone and involvement of the surrounding soft parts the plug of fat may only be inserted after careful removal of all diseased tissue.

XUM

If primary union is not effected, or should a fistula occur, the plug is to be removed at once.

Fuchs, of Breslau, claims good results from the use of pituglandol. He has used it, among other cases, once in a case of twin pregnancy with hydramnios and weak pains; once in a breach presentation with premature rupture of the membranes; once in a primipara with a brow presentation; in an artificially induced labour in conjunction with a bougie introduced into the uterus; in a case of placenta prævia lateralis; and in an unsuccessful attempt to cause an abortion at the tenth week.

From Buda Pesth comes the observation that many of the so-called vagotony cases show contraction of the pupil during inspiration, and dilatation during expiration. It is also noticed that those showing this pupillary phenomenon also exhibit a respiratory cardiac arrhythmia, but the converse does not hold true. The phenomenon is more usual in youth and especially in cases showing a pathological pulmonary condition.

The Pharmacological Institute of Vienna publishes the following statement regarding salvarsan:

The "acute" action of salvarsan is not caused by the arsenic ions, but by the whole compound. This is a totally different action to that of arsenic itself, and in many respects the direct opposite. The "chronic" action, on the other hand, is caused by the destruction of the compound and the deposition in the tissues of the actual arsenic ions. Salvarsan, in proper doses and given with faultless technique, is a relatively harmless remedy. At any rate it shows very little toxicity considering its arsenic content. The acute fatal poisoning of a healthy organism by large doses of salvarsan is caused by its action on the heart. In the case of a diseased organism, especially when the arteries are affected, there can occur shortly after the injection very alarming symptoms, and even death, as the result of the action on the diseased arteries. Or again it may be the kidneys that are at fault. If the general condition of the patient is carefully studied one should succeed in avoiding the evil effects of salvarsan, and obtain good results from its employment.

G. C. Hale.

London, Ontario.

Obituary

REGINALD HEBER FITZ

ALTHOUGH it is eminently human, it is not a little saddening that a prophet is apt to be without honour in his own country. The first great explorer of new territory in medicine of the North American continent since Ephraim MacDowell, has died, and the leading medical journal of his home city does not even give his obituary or biography: it merely contents itself with a meagre article of little over a page. Rightly the whole of the number following his death should have been devoted to his memory. The foremost medical journal of the United States, the journal of the American Medical Association, of which association he was perhaps the most distinguished member, has followed this lead, merely noting his death by five lines or so of small print huddled together with notes concerning a score or so of other members of our profession in its obituary column. And yet the recognition of appendicitis as a special entity is due to Dr. Fitz; to him is due the fact that America led for long years—and still leads—in the recognition and operative treatment of this disease. There is no other common morbid state the recognition and treatment of which is so essentially due to American initiative. Fitz it was whose paper at the first meeting of the Association of American Physicians in 1886 opened up the whole of this territory. He may truly be claimed as the first and the greatest of a great band of men who have in our generation brought renown to the United States by their devotion to medical research, and by their brilliant achievements. Nor is this his sole claim to medical immortality! To his labours as a pathological anatomist, and at the same time as a clinician, to his acute powers of observation and enquiry, we owe the clinical and pathological recognition of another morbid state, one it is true, not so common, but which, nevertheless, thanks to his labours, is to-day being increasingly recognized as a cause of grave abdominal distress, the condition, namely, of hæmorrhagic pancreatitis, with its accompanying fat necrosis. This is "Fitz's disease" every whit as much as Addison's disease is Addison's. As is rightly stated by the *Boston Medical and Surgical Journal*, it

is not given to many medical pioneers to have more than one great discovery to their credit.

To us it has always been a matter of wonder that Dr. Fitz received so little recognition from his fellow countrymen. There was never any unseemly squabble as to priority; his position as a pioneer has been freely admitted on every hand, and yet little honour has been done him. Possibly there is something in the fact that, physician as he was, his observations were of prime value to the surgeon: that our surgeons have overlooked his claims because he was not of their order and that his fellow physicians have been Gallios. It may be urged that the man himself was responsible. Genial and kindly, he was at the same time eminently modest and devoid of any particle of self-seeking. Highly regarded, nay beloved, by those who had the privilege of his near acquaintance, he had neither the presence nor the voice that stamped him as a leader among men. For long years a member of the Harvard Medical Faculty, first as professor of pathological anatomy, and later of the theory and practice of medicine, he did not stand out as a notable teacher. He did not dominate. This surely is all the greater reason why in these days we should do him honour. We are glad to note that his old university has held a memorial meeting, and that on the evening of November 17th, addresses were delivered by Dr. Keen, of Philadelphia, Emeritus President, Charles W. Eliot, and H. P. Walcott, Chairman of the Board of Trustees of the Massachusetts General Hospital, Prof. Thayer, of Baltimore, and Professor Councilman, of Harvard. This is as it should be. But if at the time of his death his services were so little recognized by the profession at large, in the years to come his fame must grow and steadily increase, so that the United States in the future will surely regard him as among the very foremost of its great men.

Dr. James Baugh, of Hamilton, Ont., died suddenly from heart failure, October 16th. Dr. Baugh, who was in his sixty-fifth year, was born in Shropshire, England. He was a graduate of Trinity Medical College, Toronto, and had followed the profession of medicine for about thirty years. He commenced his professional work in London, Ont., going thence to Waterdown, Galt, and finally to Hamilton, where he spent the past twenty-five years. He was a Mason and an honorary member of St. George's Society. He leaves a widow, one son and one daughter.

Dr. J. M. Cameron died at Yakima, Washington. Dr. Cameron was born in Nova Scotia and was educated at Arthur and later at Toronto. He practised for over twenty years at Galt, Ontario, and in 1906 went to join his brother at Yakina, where he continued his professional work. The cause of death is reported to have been mastoid abscess.

Dr. Odell Robertson, of St. Jacobs, Ontario, died November 1st, in the eighty-seventh year of his age. Dr. Robertson was a familiar figure in Waterloo County and had practised in the village of St. Jacobs for forty-five years.

Dr. Charles Stuart Murray, of Toronto, died of pneumonia November 6th. Dr. Murray was born in Limerick, Ireland. He graduated from Toronto University and also did some post-graduate work at Edinburgh. He was surgeon on the steamer *Adriatic* for seven years, practising afterwards for a short time in Newark, N.J. He then retired from professional life and went to reside in Toronto.

In the obituary notice of Dr. George Allan Kennedy in the November number, it was stated that death was due to cancer of the tongue. From more exact information it appears that this was not the cause of death.

News

MARITIME PROVINCES

The Charlottetown *Guardian* draws attention to the fact that pork intended for export must be inspected for possible traces of tuberculosis or other infection, while that intended for home consumption is subject to no inspection. The necessity for inspection is evident, for about ten per cent. of the pork inspected is found to be tuberculous.

Dr. J. J. MacPhee, of New York, has been elected a Fellow of the Royal Medical Society of Great Britain. Dr. MacPhee was born in Prince Edward Island.

XUM

SEVERAL cases of typhoid fever have occurred at Trenton, N.S.

REPORTS come from Halifax of an epidemic of typhoid fever. The disease appeared about the beginning of October and the number of cases has increased rapidly. An emergency hospital has been opened with accommodation for fifty beds. A careful investigation into the possible causes of the outbreak is being conducted and every precaution taken to prevent the further spread of the disease.

As a precaution against a possible outbreak of smallpox, all the school children in Glace Bay have been vaccinated. The contagious diseases reported during the month of September were four cases of scarlet fever and one of infantile paralysis.

EIGHTEEN cases of typhoid fever have been reported recently in Trenton, N.S.

FORTY-SEVEN patients were treated in the Victoria Hospital at Fredericton during the month of October. One death occurred.

ONTARIO

THE Royal Victoria Hospital at Barrie, on September 30th last, completed its sixteenth year of activity. During the past twelve months, 418 patients received treatment in the hospital, and 960 days of treatment were given. Thirty-nine births and twenty-six deaths occurred.

AT the annual meeting of the Fort William Royal Marine and General Hospital Board, the difficulty of collecting fees from patients was discussed, and it was decided that in future payments would be required to be made weekly. The president reported that six hundred and fifty-nine patients were admitted to the hospital during the year, and there were fifteen births and twenty-eight deaths. The cost of administration during the year was $16,095.52.

THE annual meeting of the Welland Hospital took place October 28th. During the year ending September 30th, four hundred and thirty-seven patients were admitted to hospital; twenty-five deaths and seventeen births occurred. The number of days of

treatment was six thousand one hundred and seventy-five. The hospital is overcrowded and the question of providing more room came up at the meeting. It was suggested that a nurses' home should be built but no definite decision was made.

THE biennial meeting of the Interurban Medical and Clinical Association was held November 3rd at the Toronto General Hospital.

A RECEPTION was given on November 4th at the Toronto Academy of Medicine in honour of Sir Rickman John Godlee, president of the Royal College of Surgeons. In the evening, Sir Rickman lectured before the Academy on the removal of foreign bodies from the lungs.

DURING the month of October, the cases of infectious and contagious diseases reported to the Ontario Board of Health numbered 706, with 143 deaths; this is less than during the same month last year, when 898 cases were reported and 134 deaths occurred. The cases this year included typhoid fever, 294 cases, 33 deaths; diphtheria, 255 cases, 30 deaths; smallpox, 27 cases; scarlet fever, 189 cases, 6 deaths; tuberculosis, 106 cases, 62 deaths; measles, 83 cases, 2 deaths; infantile paralysis, 5 cases; cerebrospinal meningitis, 6 cases, 4 deaths.

THE nurses' home of the old General Hospital at Toronto has been converted into a measles hospital containing thirty cots.

THE following contagious diseases were reported in Ottawa between October 6th and 28th: diphtheria, 30 cases; scarlet fever, 19 cases; typhoid fever, 7 cases; tuberculosis, 2 cases; smallpox, 2 cases; measles, 6 cases, and chicken-pox, 5 cases.

A CONFERENCE of provincial representatives was held at Ottawa October 30th. The conference was called to discuss the evidence obtained by the special committee appointed last year to investigate the pollution of streams and navigable waters. Hon. J. D. Hazen was elected chairman. A resolution was unanimously passed advocating a Federal department of health.

AT a meeting of the management committee of the Toronto Board of Education, held October 30th, it was decided that one of

XUM

the physicians attached to the public school medical staff devote himself to the examination of the heart and lungs. This was done on the recommendation of Dr. Struthers, who considered that it would be of great assistance in the early diagnosis of phthisis.

THE annual dinner of the Oxford County Medical Association was held at Woodstock October 29th. Dr. S. McLay presided. The guest of the evening was Dr. Fotheringham, professor of medicine in the University of Toronto, who gave an interesting address.

AN epidemic of smallpox is reported from St. Onge, near Ottawa. In some instances all the inmates of a house were found to be suffering from the disease, which is of a very mild character.

DURING the year ending September 30th, 1913, four hundred and sixty-seven patients were treated in the Owen Sound General and Marine Hospital. Last June the county of Grey granted one thousand dollars to the building fund in addition to the annual grant.

A RESOLUTION was passed recently by the board of directors of the Vernon Jubilee Hospital, requesting that the city council take over the assets and liabilities of the hospital at the earliest possible date. During the month of September, thirty-one patients were admitted to the hospital, thirty-six were discharged, and sixteen operations performed.

A FIRE broke out in the General Hospital at Niagara Falls on the evening of October 15th. It was soon extinguished and no serious damage was done.

ELEVEN cases of smallpox were reported recently in Collingwood. A strict quarantine was enforced, the schools and theatres closed temporarily, and all children vaccinated.

AT the annual meeting of the Board of Governors of the Ross Memorial Hospital at Lindsay, it was decided to increase the rates charged to patients. In future the charges will be,—public wards, $1.00 a day; semi-private wards, $1.50 a day; private wards, $3.00 a day. The number of patients treated during the year was 367, including 15 births; the total number of hospital days was 6,087, and the average duration of stay in the hospital was 16·59 days.

AN outbreak of typhoid is reported from the village of Union, where fourteen cases have occurred within the past few weeks.

THE military hospital at Kingston has been equipped with a medical laboratory for the third division.

QUEBEC

THE present building of the Montreal Dispensary is too small and it is proposed to build a new dispensary at the corner of Inspector and St. Antoine Streets.

THE Mackay Institute, Montreal, for the blind, deaf and dumb, has just concluded its forty-third year of activity. Seventy pupils were enrolled during the year and many were most successful in the examinations. The health of the pupils was good with the exception of a few cases of whooping cough. The superintendent reports a diminution in the number of blind: this is due partly to the work done by the Society for the Prevention of Blindness and partly to the care given to infants by nurses of the Victorian Order.

DR. J. R. OULTON has been appointed superintendent of the Alexandra Hospital at Montreal.

SINCE last May forty-five cases of smallpox have been reported at Calumet. None of these proved fatal. It is hoped that the outbreak is now over.

DURING the week ending October 25th, one hundred and twenty seven cases of infectious disease were reported in Montreal. Among them were forty cases of diphtheria, seven of smallpox, and twenty-three of tuberculosis.

SEVERAL cases of smallpox have occurred on a farm just outside Grenville. The disease is still prevalent throughout the province and the number of cases reported each day is increasing.

MANITOBA

AN outbreak of diphtheria occurred at Gretna at the beginning of October. The schools were closed and other necessary precautions were taken and the number of cases soon diminished.

XUM

THE following officers have been elected by the Manitoba College of Physicians and Surgeons: president, Dr. McCalman; vice-president, Dr. Ross; registrar, Dr. Gray; treasurer, Dr. Coulter.

A SUM of money has been collected for the purpose of giving a prize for an essay on original research work in physiology or physiological chemistry done in the laboratories of the University of Manitoba. The prize will be awarded annually or biannually, as may be decided.

IF the necessary funds can be obtained, the central building of the St. Boniface hospital is to be rebuilt. An application has been made to the provincial government for financial assistance.

THE trustees of the Winnipeg General Hospital have made application to the Legislature for an amendment to the charter of the hospital, so that if application be made by any person, an investigation into the administration of the hospital, its finances and accounts, may be made by the Commissioner of Public Utilities. Until such legislation is secured, the commissioner has been requested to investigate any complaint that may be made to him.

IN the Hampton County Court, on November 7th, judgement was given in the appeal of the four physicians of Sussex, N.B., who were convicted on September 10th, on a charge of violating the Canada Temperance Act. The appeal was sustained in each case and judgement given accordingly, with costs amounting to thirty-three dollars in each case.

SASKATCHEWAN

THE St. Paul's Hospital at Saskatoon, which was opened recently, has accommodation for one hundred patients. The cost of the building was one hundred and seventy-five thousand dollars.

THE Waddell Memorial Hospital at Canora is almost completed. Dr. Gray, of Montreal, has been appointed superintendent.

AN *x*-ray apparatus has been given to the Victoria Hospital at Prince Albert by Dr. Strong and Dr. MacMillan.

A SLIGHT outbreak of smallpox recently occurred at Barwick among the Indians in the Soo reservation.

IT is reported that seventy-one cases of typhoid were under treatment in Regina on October 1st.

TWENTY-TWO cases of typhoid were admitted to the Moose Jaw Hospital during the month of September.

ALBERTA

CERTIFICATES of qualification permitting them to apply for license to practice in the province of Alberta have been granted to the following candidates by the University of Alberta: H. Barrow, L. C. Conn, R. G. Douglas, J. F. McCracken, W. A. Proud, W. A. Scanion, F. Standish, B. C. Sutherland, J. A. Jardine, A. B. Wickware, C. F. Atkinson, P. Dahl was granted a supplemental examination in anatomy and pathology.

SINCE January 1913, forty-four cases of tuberculosis have been reported in Edmonton, and twenty deaths from the disease have occurred.

THE question of greater financial assistance to rural hospitals was recently brought up in the provincial parliament by Dr. Stanley, member for High River. He also suggested that a maternity grant should be made to the wives of new settlers.

AN administrative building and a nurses' home are to be added to the Vancouver General Hospital. The nurses' home will be built large enough to accommodate one hundred and fifty nurses and will cost about $115,000. The cost of the administration building is estimated at $90,000.

DR. C. D. HOLMES has been appointed medical officer of health of Saanich municipality, to succeed Dr. H. Rundle Nelson who has resigned.

IN future the Vernon Jubilee Hospital will be under the direction of a committee of twelve, including two members of the city council, two members appointed by the provincial government, and eight appointed for periods of three years by the city council. It is understood that a by-law will be submitted to the rate-payers for seven thousand dollars, which sum is required to free the hospital from debt.

XUM

Canadian Literature

Original Contributions

Dominion Medical Monthly, November, 1913:

The treatment of renal dropsy . . . H. A. Hare.
Internal hemorrhages: Can we control them? . . . . . F. Billings.
Tuberculin treatment . . . . . H. Mackenzie.

The Western Medical News, October, 1913:

Mammary cancer . . . . . J. Gunn.
Infection of the antrim of Highmore . . G. P. Bawden.

The Canadian Journal of Medicine and Surgery, November, 1913:

The pharmacopœia of the botanical physician eighty years ago . . . . W. R. Riddell.
The newer ideas of the pathology and treatment of gout . . . . . F. W. Rolph.

The Canadian Practitioner and Review, November, 1913:

President's Address, delivered before the Academy of Medicine, Toronto . . H. J. Hamilton.

The Canada Lancet, November, 1913:

Consideration of some of the newer operative procedures on the frontal sinus and ethmoidal labyrinth . . . . P. G. Goldsmith.
A case of hydronephrosis. . . . . H. C. Burroughs.

Le Bulletin Médical, November, 1913:

Traitement scientifique complet de la tuberculose par la combinaison du traitement rational, du traitement chimiothérapique, du traitement physiothérapique . F. Dubé.

Medical Societies

CANADIAN HOSPITAL ASSOCIATION

THE Seventh Annual Conference of the Canadian Hospital Association, held in Toronto on October 20th, 21st and 22nd, was one of the most successful ever held. Taking place as it did in the new General Hospital, no one attending the meeting could fail to carry away valuable information apart altogether from that gleaned from the splendid papers and addresses which made up the programme. The meetings were well attended and many outside superintendents were present, taking this opportunity of studying at first hand the workings of the new hospital. Among other things one of the newer phases which continually cropped up in regard to the papers and discussions was the matter of social service in connexion with hospitals. Dr. A. H. Boyce, the president, in his address dwelt upon the importance of influencing public opinion, especially in rural communities, in adopting precautions for the prevention of disease. Dr. J. N. E. Brown, formerly of Toronto but now of Detroit, gave a very interesting and instructive illustrated lecture upon the hospitals of the old world and the new. Dr. Clarke, the superintendent, gave a paper on Hospital Construction, after which he gave an opportunity for the delegates to inspect the new hospital, which is now numbered among the best to be seen anywhere. A paper on tuberculosis was read by Dr. George D. Porter, of Toronto. Dr. E. H. Young, assistant superintendent of Rockwood Hospital, Kingston, was elected president of the association.

ALBERTA ASSOCIATION FOR PREVENTION OF TUBERCULOSIS

THE Alberta Association for the Prevention of Tuberculosis was formed by the Edmonton and Calgary branches of the Canadidian Association, at a meeting held at Calgary on October 22nd last. The formation of this association is the result of years of work on the part of those in the province of Alberta who recognize

XUM

the need for more definite and united action in the prevention of the disease. With the exception of the sanatorium at Calgary, where forty patients received treatment during 1912, there are at present only twenty-three beds available for tuberculous patients throughout the province. Against this it should be noted that seventy-six cases of pulmonary tuberculosis have been reported to the provincial board of health during the present year and one hundred and seventy-two deaths from the same cause have occurred. The objects of the Alberta Association are to prevent the prevalence of tuberculosis by enlisting the coöperation of the people, by collecting and publishing useful information concerning its prevalence throughout the province, by coöperation with the government and other organizations in the enactment of proper laws adapted for the prevention of the disease, by promoting the organization and work of local societies, any of which may be affiliated with the association, by aiding in the provision of suitable sanatoria, and by other methods which from time to time may be adopted.

The honorary president of the association is the Lieutenant Governor of the Province, and the honorary vice-president is the Premier of the Province. Other officers are: president, John A. McDougall; vice-presidents, W. A. Georgeson, Calgary; Walter A. Huckvale, Medicine Hat; H. G. Nyblett, M.D., Macleod; Hon. Duncan Marshall, W. H. Clark, Edmonton; secretary, J. H. Hanna, Calgary; treasurer, Thomas Underwood, Calgary.

It was decided that a sanatorium—to be named the Queen Mary Sanatorium—should be established between Mitford and Midnapore, on land, three hundred and twenty acres in extent, which has been granted for this purpose by the Dominion government. A board of control, with power to add to its members, was elected. It was resolved that indigent cases receiving treatment in the Queen Mary Sanatorium should be paid for by the municipality in which they resided.

MONTREAL MEDICO-CHIRURGICAL SOCIETY

THE second regular meeting of the society was held Friday, October 17th, 1913, Dr. D. F. Gurd, president, in the chair.

CASE REPORT: A diverticulum of the bladder containing a large stone, Dr. Wm. Hutchinson. The patient was a man of fifty-

nine years of age who was referred to me by Dr. Shaw. He complained of slight frequency of micturition during the day, which had been present for about a year. During the past three weeks this frequency had increased and become present at night. With this increase there developed pain in the region of the bladder. Catheterization revealed the presence of five ounces of residual urine, which was loaded with pus. The prostrate was found to be somewhat enlarged. The first stage of a prostatectomy was formed and then it was found that there was a large diverticulum containing a stone. A drainage tube was inserted into the bladder and ten days later the diverticulum and stone removed. The stone was about the size of a duck's egg.

DISCUSSION. Dr. J. G. Adami: I did not quite gather whether Dr. Hutchinson had determined if this was a congenital or acquired diverticulum. From the general history and the lateral position, it rather signifies the acquired than the congenital form.

Dr. Hutchinson: From the examination of the stone, I felt that the diverticulum was of the acquired type. There are, however, certain points in favour of its being congenital. In the first place it had definite muscular walls and a contracting orifice, but on the other hand it was not in the situation in which congenital diverticula are found.

PATHOLOGICAL SPECIMEN: The pathology of Charcot's neuroarthropathy, with lantern demonstration, Dr. J. Kaufmann.

The specimen is a right knee-joint which shows the changes in the articular surfaces of the bones, the synovial membrane and the periarticular tissues. A remarkable change is noted in the articular and nutrient arteries. There is a marked endarteritis obliterans and a distinct mesarteritis; there is also a marked endo-, meso- and periphlebitis. The bones themselves show a marked thinning of the compact layer and a corresponding increase in the size of the medullary cavity. A small gummatous mass was found in the periarticular tissue. The marked chronic inflammatory reaction associated with the active lymphocytic cell invasion leads one to believe that we are dealing with a progressive and active process, and the presence of the gumma and the vascular changes typical of lues make one believe that we are dealing with an active luetic lesion. The remarkable changes in the articular and nutrient vessels suggest that we are dealing here with a vascular arthropathy rather than a neuropathic change.

DISCUSSION. Dr. C. K. Russel: This case is of extreme interest and importance to pathologists and neurologists. I do not

XUM

know of any similar observation. Of course one recognises, especially in the last two or three years, that we must change our ideas about para-syphilitic conditions, etc., since the spirochete has been found in the brain of general paretics and in the cord in tabes dorsalis. At the same time it is a little dangerous to argue that all cases of Charcot's joint are due to gumma, especially when one gets an absolutely similar condition in syringomyelia, which has nothing to do with syphilis. Clinically, these Charcot's joints are often seen to clear up considerably under active syphilitic treatment, especially if they are obtained early and treated strenuously with salvarsan and other drugs, and I think that many of them may be due to a gummatous condition; this seems all the more probable when one recognises that in these cases there is often associated more or less severe injury to the affected joint. One can imagine that a piece of lesser resistance has been formed and an opportunity given for the spirochete to proliferate. As to the endarteritis and the lymphocytic infiltration, is it not true that these would be present in any chronic inflammatory focus, as Dr. Gruner has suggested? This observation of Dr. Kaufmann's should have the effect of making every case we come across the object of more thorough study.

Dr. J. G. Adami: While a healthy man looks down upon the process indicated by the old phrase, "Thee scratch my back and I'll scratch thine," I cannot help thinking that we in Montreal are a little apt to be hypercritical regarding the work done by our colleagues, and that a heartier glow of appreciation of work well done would stimulate the whole of our medical community. With regard to the communication by Dr. Kaufmann, in my opinion it stands with Dr. Russel's work on the experimental production of the Argyll-Robertson pupil, as containing observations of which we as a society may well be proud. All of us who have enquired into Charcot's joint disease must, I think, have felt thoroughly dissatisfied with the trophic and neural theories of causation which hitherto have held sway. They did not adequately explain; the conditions in the cord and the nerves passing to the part did not confirm the idea that we dealt with a neurosis. I have seen a large number of Dr. Kaufmann's sections and wholly agree with him that they present a syphilitic infiltration around the vessels. The condition of those vessels alone strongly suggests a syphilitic lesion. I should rejoice had he been able to detect the spirochetes, but the added presence of a definite gummatous mass wholly confirms his contention, and this being so we can at last comprehend the nature

of the joint changes, namely, that we are dealing with a syphilitic periarteritis, and arteritis in general which leads to obliteration of the vessels and in addition atrophy and absorption of the tissues supplied by them. More and more we are coming to realise that these vascular changes are the striking histological feature of progressive syphilis. I do not deny that nerve changes induce atrophy and even atrophy of the bones, and in this connexion I think Dr. Kaufmann has been unfortunate in mentioning the changes associated with syringomyelia in the same breath with these "Charcot changes." The former I am fully prepared to regard as neuratrophies. I am quite prepared to find that syphilitic lesions may show themselves at regions of lowered resistance and irritation and to see in this combination the explanation of why particular joints are affected and why Charcot's disease develops.

Dr. Norman Viner: I have been very much impressed by Dr. Kaufmann's demonstration, but there is one point I would like to hear made more clear. If Charcot joints are nothing more nor less than a manifestation of tertiary lues, as Dr. Kaufmann seems to maintain, how is it that every Charcot joint one sees is associated with tabes or general paresis, and never with a mere tertiary lues. I have seen a few cases of Charcot's joint in the knee, the ankle, and the elbow, but not one of them was a frank lues, but each occurred in association with general paresis or tabes. In short, if Dr. Kaufmann's theory is right, we should expect to see the vast majority of Charcot joints in straight lues, whereas we see it in none. Finally, I would like to ask Dr. Kaufmann whether the specimen exhibited to-night comes from a case of tabes, general paresis, or tertiary syphilis.

Dr. Fraser B. Gurd: I have always had a point of view with regard to these atrophies and other conditions that were associated, or supposed to be associated, with nervous lesions, which it seems to me would be of interest in discussing this case and explaining the questions which Dr. Viner has brought up. In leprosy similar types of lesions are found. There are arthropathies in the metatarses, and there frequently occur atrophies and eventual "falling off" of fingers and toes. The usual point of view taken with regard to these phenomena is that they are due to the disturbance of the trophic nerve supply—trophic disturbances. In the leper I have never seen a case in which the history of trauma did not play a part to which the whole course of the affection could be traced. The common cause is burning of the toes. The fishermen burn their toes when coming in from fishing or stub their toes in some

XUM

way, and my belief is that there is an active inflammatory lesion of the joint. In certain types of syphilis there is a diminution of the sensibility of certain parts and as a result the patient's pain perception is not acute and he is willing to walk about with knees in a state of inflammation which a normal individual would not be able to do. I fully accept Dr. Kaufmann's explanation that the lesions are luetic—they are undoubtedly inflammatory—and the reason that they obtain such tremendous progress is that the individual is able to walk about on them, whereas a normal individual with sensitive powers would be bed-ridden. There is the same thing in the peripheral lesions in syringomyelia—injury. As with the fishermen there is a history of burning of the fingers and toes, and loss of them as a result of diminution of sensitiveness owing to the nervous lesion.

PAPER: A symposium on the Seventeenth International Congress of Medicine.

1. Dr. Maude E. Abbott. The symposium was opened by Dr. Maude Abbott with a description of the Museum of the Congress particularly of that portion of it which had been allotted to the International Association of Medical Museums, in which McGill had been largely represented, and the Wellcome Historical Museum, which was also a collection of magnitude and of the highest interest. The Congress Museum occupied a long series of well-lighted rooms on the second floor of the Imperial College of Science, South Kensington. It was divided into twenty-three sections, of which twenty-two, anatomy, physiology, pathology, etc., corresponded with the divisions of the Congress proper, while the twenty-third was an additional special department, the section of Museum Technique, which was organized, by special invitation, by the Medical Museums Association, with the coöperation of the Museum Committee of the Congress. This section occupied a relatively large space at the extreme end of the Museum proper, and was the most representative part of the collection, forming in itself a miniature museum, the large international membership of the association contributing to it scientific material of the most varied character, all of which being especially prepared for exhibition purposes was legitimately comprised under the heading of Museum Technique. Following the circulars sent out by the association, the section was divided into: (1) museum technique proper consisting of methods of preservation, preparation and mounting of material; (2) methods of housing and display, and (3) museum administration, including entry system, methods of indexing, cataloguing, and teaching.

XUM

Among exhibits of especial interest in this section were the following: Prof. Wahby, of Cairo, Egypt, showed a remarkably large and elaborate collection of specimens prepared by corrosion injection methods, both in fusible alloy, coloured celluloid, and wax, showing the cavities or channels of the body, and the relation of their ultimate ramifications. This old-time method was here carried out on such an extensive and complicated scale both in the human subject and in the lower orders, as to present some finer anatomical and physiological points not previously objectively demonstrated. Prof. Spalteholz, of Leipzig, had a beautiful exhibit, which he demonstrated in person throughout the Congress, of specimens showing his special methods of rendering organs and tissues transparent by placing them in a solution of similar refractive index. Thus a human hand, the arteries injected with cinnibar-gelatine, decalcified and rende[illegible] maximally transparent by means of a mixture of oil of wintergreen and benzyl benzoate; the skeleton of a sole stained with alizarin; a transparent human skull, etc., The various stages in the process were also shown, i. e. bleaching in (1) forty per cent. alcohol, (2) benzol, (3) mixture of oil of wintergreen and benzyl benzoate equal parts. Prof. Vollhardt, of Mannheim, had a unique and most valuable series of hearts fixed by a special method to show different degrees and stages of hypertrophy and dilatation of the chambers in the various valvular lesions and in extra-cardiac strain. His procedure was to distend the heart chambers at autopsy, preserve in kaiserling, and after fixation pass through graded strengths of alcohol, xylol and xylol-paraffin, finally immersing in liquid paraffin and keeping at a suitable temperature until thoroughly saturated. Then remove from the paraffin bath and drain. Windows may be cut from the walls of the chambers, the organ retaining its shape as during life. Prof. Adolph Meyer, of Baltimore, showed glass reconstruction models of the brain, in which the magnified serial sections were traced on glass sheets in inks, variously coloured to represent the different anatomical structures, the whole bound together and forming a transparent glass block, in which the intimate relations of parts are visible. Loose-leaf catalogues on slightly different plans were shown by Prof. Lorain Smith, Edinburgh, Dr. Braxton Hicks and the McGILL MEDICAL MUSEUM. Mr. E. L. Judah, of McGill, had a number of exhibits, which elicited much interest and approval, among which may be especially mentioned series of museum jars, graded to fit various organs, a special museum jar cement (Muir and Judah), specimens mounted on frames to preserve their anatomical relations and in fluid under clock glass, etc.

XUM

The meetings of the International Association of Medical Museums were held in a room adjoining the section of Museum Technique. There was a large international attendance and lively interest was displayed. A symposium on the microscopic technique of nervous tissues by Dr. Georgine Van Heumen, Dr. René Sand, Brussels, and Ariens Kappers, Holland, and communications on vital staining by Dr. R. A. Lambert, New York, and on maceration of renal tubules by Prof. Carl Huber, Ann Arbor, were important contributions.

Numerous exhibits of great interest were seen in other parts of the Congress Museum, as well as in the section of Museum Technique. Thus, splendid series illustrating occupational diseases with the causation of fatalities and results were portrayed. The new cardiac pathology was abundantly illustrated by electrocardiographic and polygraphic work.

The Wellcome Historical Museum, originated by Mr. H. S. Wellcome, of the well-known Burroughs & Wellcome firm, was one of the most important and interesting features of the whole congress. It was recognized as the museum of the section of the History of Medicine and was opened by Sir Thomas Barlow, president of the Congress, with addresses by Sir Rickman Godlee, president of the Royal College of Surgeons; Sir Francis Champneys, president of the Royal Society of Medicine; Sir Frederick Treves, and Dr. Norman Moore, president of the Section History of Medicine. The collections occupied two large suites of rooms and were arranged on the basis of the evolution of the history of medicine along the lines of primitive folklore on the one hand and the development of the rational Hippocratic school on the other.

This is, we believe, the first purely historical museum inaugurated. Its successful inception was greeted with enthusiasm and appreciation by the International Congress of Medicine.

2. Dr. J. G. Adami: I have been asked to speak about the outstanding features of the recent International Congress in London rather than about any individual section. Inevitably following these directions I was led to follow the lines taken by Sir Thomas Barlow, the president, by Ehrlich and the other deliverers of addresses, and must begin by a comparison between the previous London congress in 1881 and the present. In making that comparison there are certain distinctions that stand out so strongly that they must arrest everyone's attention. First and foremost, there is the marvellous change that has come over the world in thirty-two years. In 1881 it was a memorable event for any foreign physician

to make the pilgrimage to London; to-day, with improved methods of communication it is a commonplace event to take a journey of one or two thousand miles. In its day the 1881 congress shone out above its predecessors on account of the extraordinary attendance; the presence then of three thousand members constituted a record. This year's congress was similarly a record and in point of numbers constituted the greatest international congress perhaps ever held. Medical men poured in from all centres and corners of the world. There were more than eight thousand full members and more than two thousand of these brought their women-folk with them. And the extraordinary fact was that, save in the immediate neighbourhood of the meetings, the characteristic bronze medal—a badge so handsome that all were proud to wear it—was rarely to be encountered, for London is so huge that ten thousand visitors spending a week there for one particular event was scarce noticeable, they were swallowed up in the huge city. The hotels and places of amusement showed no overcrowding and life outside the congress went on as usual. Even to those of us who know and appreciate our London, this could not be but impressive.

Next must be noted the admirable way in which this huge congress was managed. There was no fuss, no agitation, and with the one rare exception of the entertainment at the Guildhall—due to the fact that whereas in one part of the daily journal it was clearly stated that entrance was to be by ticket, in the programme for the day the fact was not noted that the Lord Mayor would receive only a limited number, and as a result there was a painful mob of disappointed men and women besieging the entrance to the hall—with this one exception, everything was achieved with extraordinary precision and smoothness. The arrangements might have been in charge of officials accustomed for years to handling large bodies of men, but as a matter of fact only a few weeks before the opening the whole of the active staff consisted of the general secretary, Dr. Herringham, and one or two typewriters; and Dr. Herringham had had no previous experience of such work. Here in justice it must be added that Mr. Meakins, who had been on the official staff of the previous congress, loyally aided Dr. Herringham from his experience. Those, however, who have attended recent international congresses, more particularly in Southern Europe, at Lisbon or Rome for example, could not but realise that the success of the Britisher must largely be due to his extraordinary powers of organization.

A word also must be said regarding the munificent hospitality

of our London colleagues. Each night one or other president of a section at some club or hotel gave a dinner to some two to four hundred guests. The series was started by the dinner given by the government at the Hotel Cecil, and culminated with another given by the president at the Savoy. Each of these entertainments was wonderfully arranged and served, while the number of private dinners to two to four dozen guests was beyond counting. And again under the unwearied and cheerful guidance of Miss Barlow, the ladies of the congress were kept constantly entertained.

Turning now to the work of the congress it is impossible, in the first place, not to compare the previous and the present presidents—Sir James Paget with thoughtfulness imprinted upon every line of his face, the cultured orator whose very presence stamped him as a man apart, and Sir Thomas Barlow, a wholly different type, sturdy in build, proclaiming himself in word and act as the Lancashire man but, while doing this, showing those virtues that have brought Lancashire men to the fore: simplicity of demeanour, sound common sense and directness. No matter what occasion, and occasions were many, Sir Thomas Barlow managed with an extraordinary happiness to say that which was exactly the right word. His presidential address was most happy.

Next we came to the great public addresses given in the Albert Hall. It has been said that the 1881 congress was rendered notable by the presence at it as active participators of five immortals, Pasteur, Lister, Koch, Virchow, and Huxley—five men assured of being remembered through long centuries to come. In anything similar likely to be said regarding those who gave the addresses last August? Certainly there was one man who stood out as a peer with the five just mentioned, one sure immortal, namely, Paul Ehrlich. How about the rest?—Chauffard, who gave the address in medicine, Harvey Cushing in surgery, John Burns on public medicine, and Bateson on heredity? Will Bateson, for example, tell upon posterity? He is, it is true, a man of extraordinary ability and force and his work during all those long years upon variation and the laws underlying heredity has caused extraordinary interest. Yet that work—the study of Mendelism—seems to me to be leading to an impasse. Mendel's law only tells us what combinations and permutations may occur among the group of unit characters already possessed by the individuals, it throws no light upon evolution proper, upon the acquirements of new characters in the development of the race. Undoubtedly the greatest general address given, that which made the greatest impression and was the most masterly,

was that given by Harvey Cushing, and those of us who know him realise that great as have been his achievements in experimental surgery, much more is still to be expected of him. That address may well be submitted to those who to-day are agitating against the employment of animals in research. It was a triumphant and timely indication of what that research has accomplished for mankind during the last thirty years, what English medicine and surgery has lost during that period because of the restraining Act operative in Great Britain. The address by the Hon. John Burns had a singular interest in the noble testimony given by one, himself once an artisan, as to what the working classes owe to preventive medicine.

The outstanding features in the congress of 1881 may be said to have been the triumph of Lister in connexion with asepsis, the opening up of bacteriology as part of the work and the interest of the medical man through what Pasteur had accomplished together with the demonstration given by Koch during the course of the congress of his methods, now the universal methods of culture of bacteria. Of this last congress what will possibly be regarded as the outstanding features are:—first of all, as told by Ehrlich in his address, the triumph of the method of chemio-therapy. We in Montreal are proud to think that in his development of salvarsan, Ehrlich started from the observations of one of our Montreal men, Dr. Wolferstan Thomas, upon the value of atoxyl in sleeping sickness. This chemio-therapy has not only proved itself useful in diseases caused by trypanosomes and spirochetes and as indicated by Leonard Rogers' admirable work in Calcutta with the amœba of tropical dysentery (through the use of emetin); the work within the last few months of Morgenroth and others, demonstrates that we can look forward to the destruction of the simpler and more resistant bacteria by similar methods. It may well be, therefore, that we shall date from this congress the passage from the treatment of infections by immune bodies, in itself a notable achievement, to the treatment by specific chemical substances.

In the second place, possibly, as indicated by the discussion upon beri-beri, we may regard this congress as establishing the recognition of a group of diseases due to defective nutrition, the recognition that beri-beri, ship beri-beri, scurvy, Barlow's disease, and yet other conditions, are due, not to the mere lack of abundant food, but to a deficiency in such food of what are termed vitamines, bodies present in extraordinary minute quantities but which if not present lead to the gravest organic disturbances.

XUM

And lastly, as an extraordinary difference between to-day and thirty years ago must be mentioned the participation of the whole world in this congress. A generation has seen a public becoming generally wide awake to the development of modern medicine. It was most striking how day after day not merely the British journals but those in France and Germany and upon this continent reported the addresses and the discussions. Medicine now is a matter of which, as in the old Greek days, every cultivated individual must have some intelligent knowledge, that knowledge is part of the full education of to-day. We are carrying the people along with us in medical advances, not merely in hygiene but in infectious diseases. Only ten years ago it was regarded as a bold thing to demand the notification of tuberculosis; to-day so intelligent is the public interest in these matters that there should be no difficulty in carrying out the recommendation of the congress in demanding of every government of every civilized state, that they take steps for the notification and the eradication of venereal disease.

3. Dr. R. A. Kerry: One great trouble with the congress was that there were so many papers one wanted to hear which were scheduled for the same time, that if you wished to attend your own section regularly, you had to miss a great deal that was instructive and important to yourself. There was one object lesson, however, which the younger men would do well to heed, and this was the manner in which several of the veteran members attended every day, were on time and followed all the discussions with the utmost interest. Mr. Nettleship, who retired some years ago, was very noticeable in this respect.

In the Ophthalmic Section there were four principal discussions, the first on that peculiar intractable affection termed "Chronic Uveitis," which is exemplified by more or less exudate into the eye, varying with the severity of the case and followed, in the most severe type, by a shrinking together of the eyeball and panophthalmitis. The heading under which the paper was given out was "Chronic uveitis not due to syphilis or tuberculosis," so that those in authority evidently do not agree with the view held by some authors that the disease is always tubercular. Probably further light on the question will result in its being included in that great class of diseases which has claimed so much attention in recent years, due to chronic mixed infection. No form of treatment as yet seems to be of much use in these cases.

The next discussion was on glaucoma, a subject of great interest to us all, and was extremely interesting in that Professor Le-

grange, Major Herbert and Major Elliott, to whom the recent advance made in the treatment of this disease is so largely due, were all present and took part in the discussion. It seems to be conceded that Major Elliott's trephine operation has some advantage in that it is more easily and quickly performed. It is to be remarked, however, that even though in the majority of cases the operation is extremely satisfactory so far as preventing damage from increased pressure is concerned, the injury to the nerve in cases in which the operation is not performed soon enough is of a more or less permanent nature; cases also in which operation is followed by cyclitis are apt to be unsuccessful as the exudate tends to close the trephine opening.

There was a fairly long discussion on the influence of light on the eye, and there was a most appalling array of different affections, which we seldom if ever meet here. This was more or less a classical study, a great deal of stress being laid on the permanent changes in the tissues by exposure to strong light, cataracts and inflammatory changes in the fundus being the most serious.

Szily and Morax, in their papers on anaphylaxis, produced much the same impression as the perusal of Richet's book, that there is a great deal not proven and on which we require further information. It seems though that extended observation in this new field may lead to some remarkable results. The peculiar condition of local anaphylaxis and the even less known auto-anaphylaxis may upon further study reveal totally new principles and furnish us with very efficacious modes of treatment. The reaction produced by local anaphylaxis in the eyes is associated with exudate of plastic material and resembles that in chronic uveitis, so that if we can produce the condition at will, we need not despair of being able to prevent or remove it. It is interesting to note that the use of albumins from the crystalline lens to produce anaphylaxis yields variable results, the rule of specificity being inconstant.

There were many other good papers read at the congress and one particularly good one was read at the Ophthalmological Congress at Oxford, by Dr. Mauvas, of Paris, on albuminuric retinitis, illustrated by a series of beautiful slides in which he showed that the condition of the vessels in the eye was the same as those in the kidney.

4. Dr. G. E. Armstrong: The congress was an education to all of us who had the opportunity there afforded of meeting so many of the leaders in surgery in Great Britain and on the Continent; those on this side of the Atlantic we are more familiar with. The

XUM

meetings were well attended and the papers of a very high quality. The reading of papers in foreign languages is rather trying, I think, to most Anglo-Saxons. We may perhaps read German fairly easily, or French, and most of us, or some, can follow a clinic in German or in French with comparative ease, but to sit in a room and to hear an address read rather rapidly with all the nice words and fine phrases thrown in, is another matter. Some of us, I think, found that we would have to read the paper afterwards to get the good of it. The discussions on these papers might be more full, but for lack of time. One cannot take in the full trend of a heavy surgical paper but at the same time an exchange of views by the master minds would be of very great interest and more easily understood. It was commonly said that there was nothing very new before the surgical section. Perhaps there was no great epoch-making paper, but some of the symposiums and some of the papers really made a very important step forward, crystallized the opinions of different countries, the experiences of different clinics; and in that way I feel that the congress was really one of the most useful and helpful from an educational point of view that I have ever had the privilege of attending.

TORONTO ACADEMY OF MEDICINE

THE regular meeting of the section of medicine was held on the evening of October 14th, Dr. J. T. Fotheringham in the chair. After a brief address by the chairman on the work of the ensuing year the business of the evening was proceeded with.

Dr. Fotheringham read a report of a case of cerebral abscess in a young girl developing after an otitis media and a subsequent mastoid operation. A week after the operation while being given an enema, she suddenly became unconscious and ceased breathing. The outstanding features of the case were (1) absence of fever, (2) no eye changes, (3) absence of rigours, (4) absence of vomiting, (5) absence of giddiness, (6) no mental confusion. Dr. Middlebro of Owen Sound reported a similar case. Dr. Armour enquired in reference to ante-mortem pallor replacing cyanosis. Dr. Reeve said that cerebral abscesses often have thick walls and should be opened with a sharp pointed knife.

Dr. Fotheringham presented a case of tetanus. The patient, who was a male aged eighteen, injured his foot, and thirteen days

later developed stiffness particularly at the back of his neck; B. tetani were recovered. Ten centigrams and later twenty centigrams of Flexner's serum were given, sedatives every four hours, and injections of a dram each of carbolic acid and glycerin. An ounce of carbolic acid was given in three days; no nephritis resulted, although there was some hæmaturia. Dr. Parsons had used the serum but never fifty per cent. carbolic acid. Dr. Strathy reported a case in which mild tetanus had followed the administration of serum. Dr. Paul Scott enquired as to the protective dose of serum. Dr. Carveth advised suction and the use of tincture of iodine as a preventative.

Dr. H. B. Anderson then reported some of the work done at the International Medical Congress, paying particular attention to syphilis for the investigation of which a Royal Commission had been appointed. Ehrlich, he said, was the most prominent figure at the congress. Dr. King Smith also spoke of the important part syphilis had played in the discussions. One of the most interesting papers was on the control of syphilis by legislative measures. The need of hospital accommodation was emphasized, while another important point brought out was the fact that the regulation of prostitution did not decrease venereal diseases.

ALBERTA MEDICAL ASSOCIATION

THE next annual meeting of the Alberta Medical association will take place at Medicine Hat. The president of the association for the year 1913-1914 is Dr. C. E. Smyth; the secretary is Dr. T. W. Gershaw, Medicine Hat.

ESSEX ASSOCIATION OF MEDICAL OFFICERS OF HEALTH

THE first annual meeting of the Essex Association of Medical Officers of Health was held at Windsor on November 4th. The meeting was a successful one and was well attended. A paper on tuberculosis was read by Dr. Casgrain; and papers dealing with

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sanitation in its various aspects were read by Drs. Ashbaugh, McCormick, Brien, and Poisson. The election of officers resulted as follows: president, Dr. J. W. Brien, Essex; vice-president, Dr. Paul Poisson, Tecumseh; secretary-treasurer, W. J. Beasley. The next meeting of the association will take place at Windsor next January.

PERTH COUNTY MEDICAL ASSOCIATION

A MEETING of the Perth County Medical Association was held at St. Marys, on October 8th. It was well attended. Dr. G. W. Ross and Dr. H. A. Beatty, of Toronto, each read interesting papers. The question of the fees charged by profession was discussed, and the following rates were adopted as a minimum schedule: day visits, $1.50; night visits, $2.00; telephone consultations, 50 cents to $1.00; country visits, $1.50 within the first mile, and an additional 50 cents for each succeeding mile.

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